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NIGER AGRICULTURAL SECTOR ASSESSMENT

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VOLUME I: SYNTHESIS

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INTRODUCTION

The general nature of the following study is an assessment of the dry land agricultural sector of Niger. Although our specific task was to look at dry land agriculture, we have touched on some other areas where that seemed appropriate to the analysis. We have reviewed the general macro-economic trends and tried to project what impact the overall economy would have on the agricultural sector and what contribution agriculture could make to the national economy. We look specifically at uranium's potential to become the source of modernizing the rural sector and meeting the GON recurrent costs.

We have also looked briefly at irrigated agriculture, although this aspect of the assessment is far from complete. Some areas that have received little or no treatment are market gardening and the production of minor crops, such as onions. Livestock and animal traction are not given study appropriate to their importance. We recognize these shortcomings. Livestock analysis was beyond the terms of this assessment, and in the other cases, information was simply not available.

This assessment was conducted largely as a research and analysis of existing data and literature. No field research was undertaken and field trips and contacts with GON agencies were kept to a minimum. We did have access to a large amount of literature including some GON working documents. We expect, therefore, that there may be some disagreement with our analysis and conclusions. This is inevitable due to the fact that our assessment is based on materials made available to us.

In many cases the GON officials are aware of the findings we present. In other cases, on-going studies will help to either verify our findings or modify the conclusions we have reached. Certainly the soon-to-be-published Bordeaux studies, the on-going range and livestock research and the Niamey Productivity Project research are among these.

We recognize that, given the time at our disposal (only six weeks of field visit) and the task we were asked to perform, our assessment may invite criticism. This is an unfortunate situation which faces almost every study team. We do hope that we have raised issues that will guide others in their work.

Volume I of the study presents a synthesis of the work of individual team members. That volume was written by Warren Enger who is responsible for its contents. Volume II contains the individual studies made by the members of the team. Those studies were the result of a visit to Niger by the team from October 22, 1979 to December 15, 1979. They are presented here as they were submitted to USDA. Content of these sections is the responsibility of the authors.

In presenting Volume I as the synthesis, it should be noted that it draws almost exclusively upon the team members' reports of Volume II, unless otherwise specifically noted. Therefore the references in the text enclosed by () refer to Volume II, section and page numbers. Volume II, further, refers in footnotes to the studies and reports used by the authors as noted below:

NIGER AGRICULTURAL SECTOR ASSESSMENT
VOLUME II

Section

- A Implications of Foreign Assistance on Niger's Domestic Investment Capacity
WARREN J. ENGER/MELINDA S. SMALE
- B The Government of Niger's Agricultural Strategy and the Potential for Meeting Long-Term Goals
WARREN J. ENGER
- C Agronomy and Agricultural Research
CARL E. FERGUSON
- D Social Analysis of the Nigerien Rural Producer
JOHN W. SUTTER
- E Women in Development Issues in Niger
MELINDA S. SMALE
- F Marketing Profile: Cereals and Cash Crops
ROE BORSODORF
- G Cooperatives: Report and Analysis
HARVEY L. KISER

The major part of the Agricultural Sector Assessment was completed prior to the completion and release of the Plan Quinquennal in April of 1980. Only the figures

in the macro-economic section were corrected to reflect the Plan figures. Therefore, some discrepancies between figures in this report and those in the Plan may occur. In most cases they are not major differences unless our figures resulted from our analysis, in which cases arguable discrepancies will be obvious.

Prior to the field visit, preliminary studies were undertaken by Steve Reyna of Redso, Sociologist; Nadine Horenstein, AID Economist; and Shanti Conly, Economist. We have drawn on these people's reports, particularly the two latter for the macro-economic review.

The Agricultural Sector Assessment Team was composed of:

Warren Enger	Agricultural Economist, Team Leader
Carl E. Ferguson	Agronomist, Agronomy and Agricultural Research
Harvey L. Kiser	Cooperative Consultant, UNCC and CNCA
Roe Borsdorf	Marketing Specialist, Marketing Profile, Cereals and Cash Crops
John Sutter	Rural Sociologist, Sociology and Economy of the Rural Area

The Team was assisted by Melinda Smale, who worked on women in development issues, recurrent cost analysis and the on-going productivity projects. Ms. Smale also contributed extensively to the editing of Volume I of the study. Roger Bloom assisted in the analysis of cash crops, the macro-economic overview and the area and yield analysis.

SUMMARY

The Government of Niger estimates that a total of 15 million hectares of arable land exist in the country with only about 3.5 million hectares under cultivation. The assessment casts considerable doubt on the veracity of these figures. The patterns of settlement, land tenure and economic pressures suggest that land area appropriate for cultivation may be considerably less than 15 million hectares. Even if this is a reasonably accurate estimate, the largest portion of this acreage necessarily exists above the 450 millimeter isohyet. Remaining unexploited but cultivable land south of the 450 millimeter isohyet is found in the arrondissements of Gaya and Say.

Land under cropping appears considerably greater than 3.5 million hectares, and a closer estimate suggest 4.5 million to 6 million hectares cultivated. It is doubtful if area cropped has expanded on a direct one-to-one relationship with population. One hectare cropped per inhabitant may be a more accurate estimate. Studies indicate that as population grows, acreage cropped expands at a faster rate. On this basis, it is not unreasonable to expect area cropped to reach 8 million hectares by 1990.

As area cropped expands, more marginal land is put into production. In addition, the increased acreage is found in lower and less reliable rainfall zones. In the existing cropping areas, fallow is shortened, fewer animals can be kept, and fertility declines. Overall yields can be expected to decline, further exacerbating the pressures to expand acreage. Nevertheless, provided rainfall is consistent, expanding crop acreage should be able to maintain adequate cereals production to meet food needs through 1990.

National grain stocks virtually disappeared in 1975. With a per capita consumption in the range of 250 kgs of cereals, stocks have been slowly growing to a present level of about 300,000 tons. This quantity represents less than one-quarter of present annual consumption of 1.3 million tons. On a national basis, Niger can feed itself for about three months if crop failure occurs. Most of this reserve is found in on-farm stocks. Official GON stocks (OPVN) were about 33,000 tons in October 1979, or about 1.5 to 2.5 weeks of national consumption.

Bad weather, such as low or inconsistent rains, could lead to massive food shortages, particularly in urban and nomadic zones. Considering that the maximum annual imports of 190,000 tons in 1973 strained the Nigerien transport system, serious attention must be given to the transport system and distribution network given the possibility of 300,000-plus tons of imports in some years in the 1990s.

Productivity expressed in per hectare yields has not risen, and in fact, appears to have fallen steadily during the past two decades. GON policy expresses a strong desire to reverse this trend. Evidence indicates that only minimal, if any, results of this policy are yet occurring.

Rural extension programs have been inconsistent and generally ineffective over the past two decades. Data and studies on the effects of various extension techniques are inadequate to establish an effective extension system. Micro studies indicate a generally poor performance of extension services. Manpower is insufficient in both quantity and quality. The organizational structures are generally centralized, function from the apex and do not encourage innovation or imagination. An increase in productivity requires an input distribution system organized on a nationwide basis, coupled with an effective credit system. Neither of the existing

systems is adequate to handle the quantity of inputs that present GON strategy requires. The logistics of importing enough supplies, particularly fertilizer, or of developing in-country production capacity must be addressed. Although some progress has been made in this area, current efforts still cannot meet the requirements of the next decade.

Agricultural research appears to have made good progress over the past twenty years, but needs to be further strengthened and expanded. Trained manpower will present the greatest constraint to research over the next decade and more attention must be given to the socio-economic factors in the farming system.

Irrigation potential is limited to about 150,000 hectares. This figure is predicated upon construction of the dam at Kandaji. This acreage could contribute 400,000 tons of food annually. However, it is doubtful if one can optimistically expect any irrigation from the dam before 1990. Further, the massive training and support structures associated with irrigation from the dam will require several years to develop.

Livestock numbers have been growing since the drought, yet pressure on land for cropping and high prices for cereals may slow this growth. If cereal prices remain high, herders will be obligated to sell breeding stock to purchase millet. The terms of trade between millet and livestock will be a determining factor in growth of livestock numbers.

Cash crop production, with the exception of cowpeas, will continue to decline in favor of food crops. Food crops production is increasingly monetarized, and a money economy is rapidly replacing a traditional subsistence barter economy. Land sales, wage labor and migration are only some facets of this phenomenon.

Over the next decade, Niger's high population growth rate will create some significant changes and problems in production and social systems. Maintaining adequate food production will become increasingly difficult. Fallow lands will disappear, and open areas will be settled. Crop production will advance toward the north. It is likely that changes will occur in land tenure and social systems. Some groups, such as the nomads, may be more affected than others.

Unless productivity can be increased, regular food shortages can be expected after 1990. By that time, the natural resources of soil and vegetation will have seriously deteriorated and will be costly to renovate. Safety valves for this land pressure include the arrondissements of Say and Gaya and the irrigation potential of the river valleys.

I. MACRO-ECONOMIC TRENDS: NIGER

I.A. National Production

I.A.1. Overview

Niger's economy in the past ten years has been characterized by a relative decline of the rural sector's contribution to GDP and relative increases in the contribution of other sectors, particularly mining and manufacturing. The rural sector, which previously played a crucial role as contributor to Gross Domestic Product, earner of foreign exchange, and source of government revenues, now figures less prominently. The severe drought of 1973-1975 substantially reduced crop production and decimated livestock herds. After 1972 uranium mining emerged as a crucial and integral part of Niger's economic growth and a key factor in the structural evolution of the Nigerien economy.

Since 1975 there has been a steady increase in GDP, with most of this increase due to growth of the mining sector and the related sectors of transportation, construction and services. In 1978, estimated overall GDP at current prices amounted to 380 billion FCFA (\$1.9 billion), divided among sectors as follows: primary, 45 percent; mining and extraction, 11.5 percent; industry and electricity, 6.8 percent; construction and public works, 4.4 percent; commerce and transport 19.9 percent; services, 6.7 percent; and administration, 5.7 percent.

I.A.2. Agricultural Production

Agricultural production provided the bulk of Niger's export earnings during the pre-drought era. However, the area devoted to millet and sorghum cultivation has steadily increased at the expense of export crops and currently accounts for ninety percent of all cultivated land. Since 1975, there has been a fluctuating, but upward, trend in the total quantity of food grains produced which presently is marginally higher than pre-drought levels.

Groundnuts, cowpeas, and cotton are Niger's principle cash crops. The most significant change in Niger's agricultural sector in the last ten years has been the

decline in the volume and value of groundnuts exports. In 1966 groundnuts represented seventy percent of Niger's total export earnings. From 1966 to 1968 acreage devoted to groundnuts increased, but production showed a declining trend. This downward trend continued and in 1973, the worst year of the drought, production fell by seventy percent and increasingly farmers shifted land into food crop production. Cotton production has exhibited a steady decline since 1975, but the Niger Government hopes to reverse this trend with increased investment in irrigation. Cowpea production has been increasing since 1966 with the area cultivated up fifty percent and yields up almost threefold from 1966 levels. In 1975 the value of cowpea exports surpassed cotton, and in 1976 accounted for eight percent of foreign exchange earnings. This trend has declined in recent years due to increased home consumption.

Animal husbandry provides employment for one-fifth of Niger's population, and until 1972 represented some twenty percent of total GDP. The livestock sector was one of the worst hit by the drought and suffered herd losses of up to fifty percent. Since 1974 the Government of Niger has instituted herd reconstitution programs, and some herd categories have reached pre-drought levels. However, the relative contribution of the livestock sector to GDP has been steadily decreasing and currently represents only 10.4% of estimated total GDP.

Livestock continues to rank second in Niger's total commodity exports although there have been sharp fluctuations in volume and value. Between 1968 and 1973, volume of exported livestock almost tripled, reflecting herders' inability to maintain herds on existing grazing areas during the drought years. From 1973 to 1975 livestock export volume fell by three-fourths. However, with a meat shortage in West Africa, unit values rose sharply, resulting in a doubling of export values. Livestock currently represents eighteen percent of total export earnings.

I.A.3. Industry

Niger's small internal market coupled with high transportation and energy costs relegates the industrial sector to a minor role in the economy, representing an estimated ten percent of GDP. The agricultural processing industry has fared poorly due to the decline of industrial crop production during the early and mid-seventies. Groundnut processing in particular at one time dominated the processing activities, accounting for eighty percent of the total value of processing and representing 6.5 percent of GDP. The sharp decline in groundnut production has resulted in a concomitant drop in the contribution of groundnut processing to GDP estimated at only 1.5 percent in 1978. Cowpea processing has risen steadily, and as of 1978 accounts

for 66 percent of total value of processing at constant prices. The other processing activities have been operating below capacity--cotton and rice paddy processing due to insufficient supply, and livestock processing due both to inadequate supply and the preference of Nigeria (Niger's primary livestock market) for live cattle.

I.A.4. Mining

The contribution of the mining sector to GDP has increased from 1.1 percent in 1971 to 9.4 percent in 1978, spurred on by a more than five-fold increase in the unit price of uranium. Consequently, uranium has emerged as Niger's top export, currently representing three-fourths of total export earnings. Despite the fact that there has been little forward linkage (i.e., processing), uranium has had substantial backward linkage effects in the transportation, construction and service sectors. In addition, the uranium-derived revenues have substantially increased the investment capability of the government.

I.B. Foreign Trade and Payments

Niger's balance of payments from 1968-1978 has been characterized by a fluctuating and increasing current accounts deficit which has been offset by capital inflows in the form of foreign aid and investment. Apart from small deficits in 1968, 1974, and 1978 the overall balance of payments has been in surplus, peaking in 1976 at 7.9 billion FCFA. The current account deficits have been due to a four-fold increase in payments for goods and services going from 7 billion FCFA in 1968 to 27.5 billion in 1978 (\$137 million). The increasing net service deficit is a result of expenditures on technical assistance, freight, insurance, and investment income. In addition, rising fuel and capital goods costs have contributed to the overall deficit. From 1970-73 unrequited transfers, usually in the form of development aid, offset the goods and services deficit, resulting in a surplus of the current account. The current account deficit increased six-fold from 3.2 billion FCFA to 19.3 billion FCFA between 1974-1978, reflecting decreasing official transfers and the rapidly increasing net services deficit. This deficit, however, has been offset by inflows in the capital account. Niger has experienced a seven-fold increase in capital account inflows going from 2.3 billion FCFA in 1968 to 15.5 billion FCFA in 1978. The capital account inflows appear to have stagnated in 1978, and Niger had an overall balance of payments deficit, the first such deficit since 1974.

Food, beverages and tobacco accounted for ten percent of Niger's imports during 1968-1971, but from 1972-1974 this category of imports increased to 17 percent as

the drought increased the need for emergency food supplies. This amount has since leveled off. Furthermore, from 1968-1976 the value of fuel imports rose from 497 million FCFA to 3,545 million FCFA, and capital goods imports increased from 3.5 billion FCFA to 12.3 billion, representing 44 percent of total import value.

During the drought years, the terms of trade were turned against Niger. However, since 1975, import price increases have remained below export price increases; the dramatic increase in uranium prices has had a particularly positive impact on Niger's terms of trade.

I.C. Public Finance and Investment

Niger's budget in the last ten years has been characterized by current budgetary savings due to conservative spending policies, and rapidly increasing expenditures on the capital account, reflecting growing inflows of taxable uranium revenue. From 1969-1973 both revenues and expenditures increased at a steady pace. After 1973 there was a more rapid increase in revenues and expenditures although pursuant to a policy of strict expenditure control, growth of current expenditure was kept consistently below that of revenue. Capital expenditures have risen consistently and rapidly since 1974 and now represent 37 percent of total expenditures. This rapid increase (an average annual growth rate of over eighty percent since 1976) is due to the growth of uranium mining activities from which Niger derives sizeable revenues.

The major items of government spending during the pre-1974 era were goods and services amounting to 92 percent of total expenditures, with wages accounting for some 46 percent of this amount. Goods' and services' relative share in total spending declined to 68 percent in 1977 while the relative share of public debt and subsidies and transfers increased. Public debt expenditures increased from 1.3 percent in 1972 to ten percent in 1977, and expenditures on subsidies and current transfers rose by 35 percent annually during these years and now represents 22 percent of total. The difficulties of the government in absorbing the revenues from uranium in the form of public investment has led to increased transfers to the banking system. This inability to carry out investment projects is related to Niger's shortage of trained manpower (Vol. II.B., p. 42). Education receives the second largest share of current expenditure. Its relative share has gone from 14.4 percent in 1969/70 to 16.2 percent in 1978/79, while in absolute terms there has been a four-fold increase. Investment in agricultural development is usually supported by foreign donors, and thus, represents only a small share in Niger's public accounts.

Tax revenue has provided the bulk of total revenue during the past ten years, representing 95 percent of public revenue. Prior to 1973 tax revenue grew at an average annual rate of 15 percent; from 1974 to 1975, these tax revenues increased by almost fifty percent annually, primarily as a result of taxable uranium revenues. As of 1976 taxes on goods and services still provided the major portion of revenues to the government (33 percent). The tax on foreign trade has remained steady over the last ten years, representing 17 percent of government revenues. This tax is made up of import and export duties. The largest portion of nontax revenue has accrued in the form of mining rights payments from France, and it is expected that this category of revenue will increase with the expansion of the mining sector.

I.D. Employment

Agriculture provides the main source of income for 85 to 95 percent of Niger's population and employment for almost 98 percent of her work force. Employment in non-agricultural sectors currently accounts for 2.2 percent of the labor force. Of the non-agricultural employees (approximately 50,000 workers), almost one-half are in government service.

Employment in the industrial sector has remained weak due to its high dependence on an erratic agricultural sector. Processing of industrial crops (peanuts and cotton) and livestock was the main industrial employer prior to 1974. The decline in production of these crops along with decreased livestock numbers and preference for exporting live animals has caused a reduction in employment in these industries.

The most important element of growth in modern industrial employment is in the mining sector and the complementary sectors of construction, transport and public works. Although employment in mining will increase as new mines come on stream, mining's capacity to create employment is limited due to the high capital intensity of mining operations.

Structural shifts in the population due to outmigration from rural areas and a younger population due to a high birth rate are occurring. This will tend to decrease the percentage of people in agricultural employment relative to the total and put pressure on the productivity levels in the rural sector.

The drought tended to accentuate seasonal migration from the rural to urban areas, and unemployment in urban areas has, thus, tended to increase as jobs in those areas have not kept pace with the numbers of job seekers.

Active population (available work force) was growing at a rate of 2.4 percent in 1976. Non-agriculture population was growing at a rate of 6.1 percent with non-agricultural active population growing at a 5.5 percent rate. Thus the active agricultural population was growing at a rate of 1.8 percent. With the present population growth rate of 2.7 percent, it means where one person fed 2.5 people in 1970, one must feed three in 1990 (Vol. II.F., pp. 2, 59).

I.E. Terms of Trade/Resource Transfers--Rural Sector

The net transfer out of the rural sector on government or commercial account is difficult to assess. The major components of flows to government are direct taxes (livestock and head taxes) and revenues from marketing operations. These are offset by governments' expenditures in the rural sector. Commercial account transfers are virtually impossible to measure as no reliable data exists on volumes and values of transfers in the commercial sector. However, price indices give us some indication of relative gains and losses.

Transfers to government in the form of head taxes on rural people and livestock were important through 1977. These steadily increased from 1948 through 1975. However, after 1976 these taxes were reduced and now constitute only local taxes. Moreover, the relationship of head taxes to producer prices has been in the farmer's favor since 1971 (Volume II.D, p. 9).

Government of Niger revenues from marketing operations on cash crops are important. Including operating profits, export taxes, contributions to CSPPN and windfall profits, the total net flow to government during the 1964-1976 period is in excess of 46 million dollars (Volume II.F, pp. 100-101).

Government contributions to the rural sector in the form of subsidies, research or extension are difficult to measure. We can say that increases in government budget allocations to agriculture since 1974 appear to offset what may have been a net transfer out of agriculture prior to 1974.

The rapid price rise of agricultural raw materials in the last half of the 1970's has tended to invalidate the contention that farmers have suffered declining relative terms of trade with their urban counterparts. Although this was true through the 1960's with stagnant farm products prices facing rising consumer costs and taxes, farmers appear to have regained some lost ground. Data from the Ministry of Plan and BCEAO indicate that the index of prices for consumer goods commonly bought by rural people rose as follows between 1970 and 1978 (1970 = 100): sugar, 100 to 238;

kerosene, 100 to 156; clothing, 100 to 207. At the same time the index of official prices for millet, peanuts and cotton show prices over 1970 (1970 = 100) of 400, 357 and 289 respectively. The overall consumer price index for African families rose from 100 in 1970 to 242 in 1978, while the index of rural sector GDP per capita rose from 100 in 1970 to 383 in 1978, according to Ministry of Plan estimates.

Resource transfers in the form of rural savings going to the other sectors appears to have been highly unlikely. What savings have occurred appear to have been kept in the form of livestock or other products and therefore not direct outflows from the rural sector.

It appears then that the combination of taxes, marketing operations and rising consumer goods prices worked against the rural sector prior to 1974. However, the reduction in taxes, heavier emphasis on food crops and rising farm product prices appear to have reversed this situation in the latter half of the decade. Government's present emphasis on investment in the rural sector coupled with large infusions of foreign aid in rural development should offset the earlier outflows. This should work favorably in stimulating the production of food needed in the future decades.

I.F. Projections, 1979-1983

Consistent with the trend over the 1976-1978 period, the 1979-1983 Five Year Plan Budget continues the heavy emphasis on investment. Tables I.1 and I.2 give the breakdown of anticipated public and private investment by sector. The total of 726.9 billion FCFA (U.S. \$3.63 billion) averages 145.4 billion FCFA per year (U.S. \$727 million) over the Plan period. At the same time, the current expenditure budget is expected to rise from 37.3 billion FCFA (U. S. \$186.5 million) in 1979 to 65.8 billion FCFA (U.S. \$329 million) in 1983 (Table I.7).

The overall annual projected growth in GDP is 9.5 percent, which is largely due to the high level of growth expected in the modern sector. The rural sector is expected to obtain growth rates of 3 to 3.3 percent. (See Table I.4.) Although agriculture's share of the overall investment budget will decline in relative terms (Table I.6) in absolute terms a net increase is seen.

The major concerns that the Plan elicits is the ability of the country to absorb such high levels of investment spending (Vol. II.B., p. 42) and the recurrent costs that will be generated (Vol. II.A.)

Table I.1. PUBLIC INVESTMENT 1979-1983
(in billions of FCFA constant prices)

Public Investment	1979	1980	1981	1982	1983	Total
Agriculture ¹	8.7	11.3	13.1	14.7	17.1	64.9
Livestock	3.3	4.0	4.6	3.6	3.0	18.5
Waters & Forests	.6	1.0	.9	1.0	1.0	4.5
Agricultural Research	.6	1.2	1.3	.8	.4	4.3
Mining	--	3.5	8.8	12.8	14.4	39.5
Industry	1.5	2.5	2.4	3.1	4.2	13.7
Energy	2.8	3.8	2.7	1.8	5.9	17.0
Commerce	2.0	1.6	.7	.5	.4	5.2
Transport ²	3.2	5.9	9.3	12.5	14.9	45.8
Transport Equipment	.4	.3	.6	.7	.8	2.8
Air Transport	.7	1.0	1.5	1.6	1.5	6.3
Telecommunications	.6	2.6	3.7	3.4	2.5	12.8
Financial Institutions ³ and Insurance	.1	1.1	1.0	.9		(3.1)
Tourism and Hotels	.9	1.5	3.0	1.0	2.0	8.4
Administration Infrastructure	4.8	5.9	5.7	5.5	4.2	26.1
Education	3.4	9.4	11.8	11.2	8.6	44.4
Professional Training	.6	.5	1.1	1.6	1.6	5.4
Literacy	.1	--	.2	.2	.2	.7
Animation ⁴						
Scientific Research ⁴						
Information	2.6	2.3	2.4	1.8	1.0	10.1
Youth and Sports	.5	1.5	2.3	1.1	.3	5.7
Health	1.5	4.0	4.5	4.9	4.0	18.9
Urbanism/Housing	.6	1.7	1.1	1.0	.7	5.1
Water	2.8	3.4	6.4	5.9	5.9	24.4
TOTALS ⁵	42.2	68.9	88.1	90.7	94.6	384.5

¹Rainfed and Irrigation

²Infrastructure--roads bridges

³Not included in totals

⁴Included elsewhere

⁵All figures rounded

Source: Plan Quinquennal 1979-1983, Ministry of Plan

Table I.2. PRIVATE AND SEMI-PUBLIC INVESTMENT, 1979-83
(in billions of FCFA)

	<u>Total for 5 Years</u>	<u>Annual Average</u>
Mining	222.0	44.4
Industry	31.0	6.2
Energy	52.0	10.4
Infrastructure	14.6	2.9
Transports ¹	16.1	3.2
Training	1.0	0.2
Trade	5.7	1.1
Tourism	--	--
	<u>342.4</u>	<u>68.4</u>

¹Equipment only

Source: Ministry of Plan, Niger

Table I.3. TOTAL INVESTMENT, 1979-83
(in billions of FCFA)

	1979	1980	1981	1983	Total
Public Investment	42.2	68.9	88.1	90.7	384.5
Private and semi- public Investment	--	--	--	--	<u>342.4</u>
Total					<u>726.9</u>

Source: Plan Quinquennal, 1979-83, Ministry of Plan, Niger

Table I.4. PROJECTED ANNUAL GROWTH RATES, 1979-83
(in percentage)

	<u>1979-1983</u>
GDP	
<u>By Sector</u>	
Rainfed agriculture	3.3
Irrigation	--
Forestry	--
Mines	17.0
Energy	--
Industry (modern)	29.1
Industry (traditional)	3.6
Construction	26.6
Commerce	6.9
Transports	16.1
Services	7.6
Administration	13.1
Duties and Import	15.9
<u>By Year</u>	
1979	14.2
1980	9.7
1981	9.0
1982	6.7
1983	10.8
Average 1970-1980	9.5

Source: Plan Quinquennal, 1979-83, Ministry of Plan, Niger

Table I.5. ESTIMATES OF GDP, 1975-1978
(in current market prices: in billions of FCFA)

	1975	1976	1977	1978
<u>Sources</u>				
BCEAO	159.7	165.1	208.1	282.2
IMF (February 1977)	131.5	163.5	190.0	--
IMF (January 1979)	149.2	207.6	281.2	372.2
World Bank	167.4	..	224.0	282.2
Ministry of Plan	189.2	251.6	309.6	280.0
<u>GDP Per Capita (In US \$)</u>				
World Bank	<u>162</u>	<u>..</u>	<u>180</u>	<u>245</u>

.. Not available

Source: World Bank

Table I.6. COMPARATIVE INVESTMENT PATTERN
(in percentage)

	<u>1976-78</u>	<u>1979-83</u>	<u>Change</u>
Agriculture	21.5	16.8	(-)
Livestock	9.1	5.5	(-)
Forestry	1.5	5.4	(+)
Infrastructure	19.6	11.3	(-)
Telecommunications	6.2	3.3	(-)
Water Supply	4.1	5.4	(+)
Government Infrastructure	3.6	6.4	(+)
Energy	2.8	4.4	(+)
Education	8.3	13.0	(+)
Health	4.5	4.8	(+)
Mining	2.3	10.2	(+)
Industry	1.0	3.8	(+)
Tourism	1.0	1.5	(+)
Other	14.5	8.2	(-)

Source: Ministry of Plan, Niger

Table I.7. FINANCING REQUIREMENT, 1979-83
(in billions of FCFA)

	1979	1980	1981	1982	1983
<u>Source</u>					
Current Budget	37.3	42.0	47.1	56.1	65.8
Investment Budget	22.0	23.6	29.9	35.9	44.2
National Total	<u>59.3</u>	<u>65.6</u>	<u>77.0</u>	<u>92.0</u>	<u>110.0</u>
Foreign Aid ¹	20.6	30.0	35.0	37.0	38.0
Borrowing ²	--	15.5	23.2	17.6	12.0
Foreign Source	<u>20.6</u>	<u>45.5</u>	<u>58.6</u>	<u>54.6</u>	<u>50.0</u>
GRAND TOTAL	<u>79.9</u>	<u>111.1</u>	<u>135.2</u>	<u>146.6</u>	<u>160.0</u>
<u>Use</u>					
Operating Budget	<u>37.3</u>	<u>42.0</u>	<u>47.1</u>	<u>56.1</u>	<u>65.8</u>
--Admin Budget	34.6	38.2	42.9	48.9	56.7
--Public Debt	2.7	3.8	4.2	7.2	9.1
Investment	<u>42.6</u>	<u>69.1</u>	<u>88.1</u>	<u>96.5</u>	<u>94.2</u>
From:					
--Investment Budget	22.0	23.6	29.9	35.9	44.2
--Foreign Aid ¹	20.6	30.0	35.0	32.0	38.0
--Borrowing ²	--	15.5	23.2	17.6	12.0

¹Including Grants and loans, bilateral and multilateral.

²Borrowing from international financial markets only.

Source: Plan Quinquennal, 1979-83, Ministry of Plan, Niger

II. NATURAL RESOURCES

II.A. Land and Soil Resources

II.A.1. Extent of Land Resources

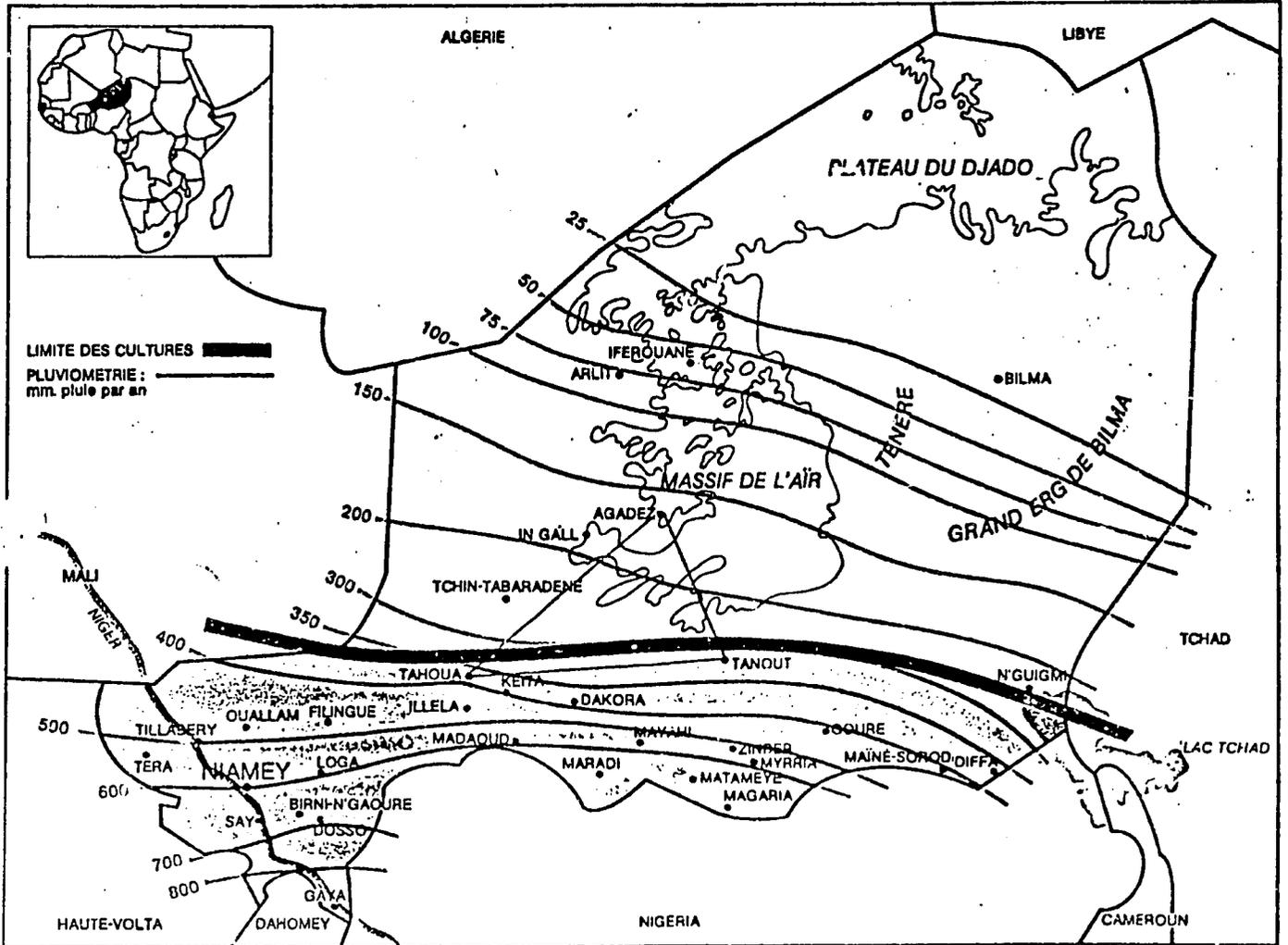
Of Niger's 126.7 million hectares of land and water surface, the Government of Niger (GON) estimates that only 30 million hectares, or about 24 percent, are agriculturally "useful" (Vol. II.C., p. 1). Three-fourths of the National area is unsuited for agriculture because of:

- (a) a harsh climate with annual rainfall less than 350 millimeters, high temperatures, and rapid evaporation; or
- (b) rock outcrops, shallow soil, steep slopes, excessive erosion, or shifting sands.

The agriculturally "useful" area lies largely south of the 350 millimeter isohyet and extends from the border with Upper Volta and Mali in the Southwest corner of the country in a band some 1,500 kilometers long and 200 to 250 kilometers wide to the Chadian border on the east. Within this zone it is estimated that, of the 30 million hectares, 15 million hectares are arable. About ten million hectares lie in the 500 to 850 millimeters rainfall zone (the "zone soudanienne") and 20 million hectares fall in the 350 to 550 millimeters rainfall range (the "zone sahelienne"). The GON definition of "agriculturally useful" land appears to be all the land falling below the 350 millimeter rainfall isohyet.

Recognizing the increasing drought hazard to crops as one moves northward, and the conflict between the cultivators and nomads in search of pasture, the Administration in 1954 established a northern limit of crop production, or "Limite Nord des Cultures" (LNC), which roughly coincided with the 350 millimeter isohyet (Figure 1). The LNC was revised further north by the GON in 1961, recognizing the northward pressure by cultivators. The zone north of that "line" was reserved for pastoral purposes, and south of the "line," crops were to be protected from intrusion and indiscriminate grazing of nomadic herds.

Figure 1. REPUBLIC OF NIGER
RAINFALL AND NORTHERN CROP LIMIT



The GON assumes that fifty percent of the land within this rainfall zone is "arable." However, the nature of the terrain, the extent of rock and laterite outcroppings, and other physical limitations indicates that the actual extent of "arable" land is somewhat less. This latter contention seems to be supported by evidence of settlement patterns in the cultivated zone.

According to the GON, only about 3.1 million hectares were under cultivation in 1977 (Volume II.C, p. 2). This figure may have reached 3.6 million hectares in 1979 (Volume II.F, p. 55). High population densities in regions that are the most suited to agriculture suggest a cultivated area of 50 to 100 percent higher than that estimated by the GON. Over-population and over-exploitation of these zones would not be likely if more suitable land were available. Further, settlement beyond the designated "northern limit of cultivation" would not occur if suitable land were in fact available in higher rainfall zones.

In recent years, population pressure requiring additional land for food crops has pushed the cultivation "limit" to the 300 millimeter isohyet in most areas and even further in the area of Tanout. In some areas the "limit" is largely ignored. Studies in Zinder Department estimate that 192 square kilometers of land north of the "limit" are presently under cultivation (Volume II.D, pp. 23, 67).

The extent of actual arable land and present cultivated land is of considerable importance. If the former is much less than present estimates and the latter significantly greater, then increasing requirements for cereals due to population growth will cause occupation of all the arable land more quickly than is presently believed.

A notable exception to the general demographic pressure on land resources is the Say Arrondissement (Volume II.B, Annex I). Due to the presence of onchocerciasis in the region, population densities have remained comparatively low. The WHO program to control the vector of the disease, the black fly, now makes the area more amenable to exploitation. Say is in a relatively high rainfall zone and has better soils than many other areas in Niger. Estimates of exploitable farmland are in or above the half million hectare range. Thus, Say has the potential of adding over $\frac{1}{4}$ million tons to the nation's cereal production.

II.A.2. Irrigation Potential

Niger has a limited potential for irrigation development. At present, about 26,000 hectares, largely in small plots, are irrigated by traditional methods. Some 5,000 hectares, located mainly in the Niger and Komadougou Valleys, are under managed irrigation.

Although improvement of the irrigation potential will not be neglected in the new five year plan, this potential has been evaluated at only 150,000 hectares (Volume II.C, p. 24). Soils of the valleys and depressions that are suited for irrigation are higher in fertility, have a greater water-holding capacity, and consequently, are much more productive than upland soils, particularly under irrigation.

The major constraints in expanding irrigation are the very limited water resources outside the Niger Valley, the excessive cost of developing the irrigation systems (Volume II.C, p. 24; Volume II.B, p. 2), and the limited areas of suitable soils along the Niger which can be irrigated by gravity. The Niger River is the country's only permanent stream. In 1978, only about 3,684 hectares composed of several areas of varying sizes were under controlled irrigation in the Niger and Komadougou Valleys. In addition, about 1,380 hectares were irrigated from small ponds and reservoirs.

II.A.3. The General Nature of Niger's Soil Resources

Reconnaissance soil surveys and other studies conclude that Niger's overall soil resources are moderately poor. This general conclusion is based on their inherently low fertility, climatic limitations, physical characteristics, and the "fragile" and unstable nature of soils which are put under cultivation following a period of bush fallow.

Most of Niger's agricultural soils are developed in wind-blown, or water-deposited sands of varying depths. These dunal sands originated during an early period of active physical weathering and were probably subjected to intense chemical weathering and leaching of basic elements (calcium, magnesium and sodium) during a subsequent geological period when rainfall was much greater than it is today. This brief history of their origin accounts for their generally sandy nature, medium to high acidity, and low content of exchangeable bases. One usually finds soils that are neutral or alkaline in reaction in much of Niger.

The rolling landscape of the agricultural zones is broken by inter-dunal valleys. Some of these are fossil valleys dating from an early pluvial period. These valleys generally have finer-textured soils than the dunal or upland soils such as sandy loams, loams or sandy clay loams. They are higher in fertility and have a greater water-holding capacity than the dunal soils. Consequently, they are better adapted for crops that have high water and fertility requirements such as grain sorghum, sugar cane and corn. Interspersed in the dunal soil matrix are depressions in which water accumulates during rainy periods. Soils of the depressions contain a higher percentage of clay and silt, have a better moisture regime for crops, and consequently are more productive than adjacent dunal soils. Many have shallow water tables which permit limited irrigation during the dry season (Volume II.C, p. 5).

In addition to the dunal, valley and depression soils, Niger has a significant area of soils with a heavy indurated lateritic crust. The hardened layer may be at or near the surface, or covered with a sandy layer of variable depth. Such soils are drouthy, low in fertility, highly subject to erosion, and very low in productivity. If the lateritic crust is continuous and at or near the surface, the soils have little or no value for agriculture (Volume II.C, p. 5).

II.A.4. Characteristics Important for Agriculture

One of the most important characteristics of Niger's agricultural soils is the very high sand content. Fine sands and loamy sands are the predominant soil textures in the rainfed uplands. Most soil descriptions show over 85 percent and some over 90 percent sand in the surface and subsoil layers. Such soils have a low water-holding capacity and a very limited capacity to retain soluble fertilizer nutrients (low cation exchange capacity) against the leaching action of percolating water. They are highly susceptible to wind and water erosion, and because of the sandy textures and year-round high temperatures, the percentage of soil organic matter is very low.

These characteristics present some important management problems and constraints. Use of fertilizers, legumes in crop rotation and soil and water conservation practices will be needed components of soils management (Volume II.C, pp. 6-7).

II.B. Population

II.B.1. General Population

It is estimated that in 1979 the total population of Niger reached 5,377,700 (Volume II.F, pp. 2-3). Most of this population is concentrated in the southern part of the country below the 350 millimeter isohyet mentioned in A.1 above. The average density figure of slightly over four persons per square kilometer is misleading because most of the population live in the heavier rainfall zones of the south or are concentrated along the rivers and dallohs.^{*} In some of these areas, according to World Bank estimates, population densities in the agricultural areas may reach 80 to 100 persons per square kilometer.

II.B.2. Population Growth and Structural Shifts

The overall population growth rate of Niger is estimated to be 2.7 percent (Volume II.F, pp. 2-4). If this trend continues, in twenty years the total population should reach 9.4 million (Volume II.F, Table 1). Although the extremely high growth rate of the population is of great concern, equally important is the population shift occurring between urban and rural sectors. If the same growth rate of urbanization continues, almost 2.8 million people will be urban dwellers by the year 2000 (Volume II.F, p. 2 and Table 1). This structural shift could have serious implications for agriculture over the next two decades (Volume II.F, pp. 12, 52-66).

Both population growth rates and structural determination of population will depend greatly upon GON policies. If heavy allocations of Government funds are placed in health programs, a declining death rate could cause even greater growth rates of population. Heavy investment in the present urbanized areas of the country can maintain or even increase the rate of urbanization. (See I.D above.)

II.C. Environment

II.C.1. General

The major part of Niger has a desert climate with little or no rainfall. This area is of little agricultural interest except for small oases, most of which are

^{*}Dallohs are valleys created by ancient watercourses and generally have high water tables.

found in the Air Mountains. In the southern portion of the country crop production and livestock raising occur according to terrain, soils and rainfall. Most of the farming takes place in a band across the country between 13° and 15° north latitude which receives an annual rainfall of 350 to 650 millimeters. A small area in southern Dosso Department receives rainfall that may exceed 950 millimeters annually. North of the 300 to 350 millimeter rainfall line, the area is mainly open grassland, gradually becoming desert as one moves north, and primarily given over to nomadic livestock herding.

The mixed forest and grasslands that once predominated over the southern section of Niger are gradually disappearing. As population pressure increases, the demand for farmland, firewood and animal fodder increases. Gradually the great open rangelands and woodlands of the African commons give way to permanently settled and farmed areas where over-exploitation of natural resources is increasing.

II.C.2. Desertification

The northern limit of cultivation set by the Administration recognized the fragility of the soils and vegetation in the lower rainfall areas, and the disastrous consequences which may result from removal of vegetation through indiscriminate cultivation. Although the position of the LNC (Limit Nord de Cultures) was probably somewhat arbitrary, it served to slow for a time the continuing movement northward of the cultivated zone. The natural demographic increase has made it difficult to enforce non-cultivation north of the line as people seek new lands to grow food. The expansion and intensification of cultivation at the LNC (see II.A.1. above), combined with overgrazing, will, if not checked, result in diminishing capacity of the landscape to produce vegetation and cause widespread desertification along the northern limit of the cultivated zone (Volume II.C, pp. 16-17).

Desertification in the Zinder Department was studied using landsat imagery and ground verification. More than 90 percent of Zinder was classed in the "severe" category. Causes of desertification in Zinder were identified from secondary evidence as:

- (a) Overgrazing during the 1971-73 drought by an animal herd grown too large as a result of the generally favorable weather before the drought. Around many wells and other water points, mini-deserts have been created by removal of vegetation by overgrazing and soil trampling by animals.

- (b) Cutting of trees for fuel and wood for construction with no program for replanting. Removal of trees has contributed to increased wind and water erosion.
- (c) Cultivation of marginal lands because of population pressure and the need for food crops. With the onset of the extended drought, crops failed and the bare fields were highly exposed to wind erosion.
- (d) Inadequate response to the drought. There was no place in the better rainfall areas to the south where villagers could go once drought struck, so they largely stayed in their villages, putting additional pressure on the scanty vegetation and water resources.

All areas are not subject to desertification to the same degree. Consequently, desertification in Zinder is discontinuous, with some areas more affected than others. The symptoms of desertification are: areas denuded of all vegetation, severely eroded areas, exposed rock, areas with salt accumulation on the surface, and active sand dunes.

The symptoms and causes of desertification in Zinder are now identified, but detailed planning and implementation of programs to reduce and hopefully to eventually check desertification have hardly begun. In the more favorable areas, relatively small pilot projects such as tree planting, establishment of windbreaks to protect high value crops, and dune stabilization by vegetative means have been started. The tremendous cost, and likelihood of serious failure of any massive campaign to "stop the advance of the desert" by large-scale tree planting and construction of water control structures argue for a more basic approach. Since man is the causal agent of desertification, his actions must be modified. Natural regeneration of the vegetation might be a much less costly and surer approach than the more spectacular actions which have been proposed.

II.C.3. Soil Degradation in the Humid Zones

Even in the more humid cultivated zone, many areas of poor soil are undergoing serious wind and water erosion. Increasing the fertility of these soils by wise use of fertilizers can reduce susceptibility to degradation by wind and water. It may be that expansion of the use of fertilizers and animal manure could be the most effective soil conservation action the GON could undertake during the forthcoming Plan. The additional vegetative growth and more vigorous plants resulting from an increase in soil fertility can reduce the danger of both wind and water

erosion. Other practices which should be followed to reduce water loss by runoff, and soil erosion, are planting crops on the contour and leaving crop residues on the surface.

Wind erosion is an ever present danger to Niger's cultivated sandy soils. The Forestry Division of INRAN proposes to study the mechanism and amount and nature of the problem to develop better and more effective silvaculture practices for the control of wind erosion in cultivated areas.

II.C.4. Forestry Resources

In 1977 it was estimated that "forestry lands" covered 14,000,000 hectares. Of this area, 210,000 were classified forest; 69,000 hectares were to be reforested, or were areas closed to grazing; 235,000 hectares were in process of classification or in forestry projects; and 2,875,000 hectares--some included in the above classes--were considered as game reserves, either classified or projected. There were 76 classified forests of which 25 were in Zinder and 14 were in Maradi Departments (Volume II.C, p. 18).

Niger has eight nurseries capable of producing 1.5 million trees per year. The principle tree species used for reforestation are Neem, Gao (*Faidherbia albida*), Prosopis, Parkinsonia, Senegal acacia, Nese, Eucalyptus, Tamarind and Seyal acacia.

The difficult technical problems of establishing forests in the edge of the deserts are well known and solutions have not been readily available. Most reforestation projects are characterized by extremely high per unit costs and low survival rates for plants. Given the vast areas concerned and the pressing nature of the problem, it appears that a more integrated approach on a national scale must be studied.

Gao (*Faidherbia albida*) is a valuable tree for the small traditional farmer. It belongs to the legume family, and by a symbiotic relationship between its roots and soil micro-organisms, has the capacity to fix atmospheric nitrogen into an organic form building it into plant tissue. The tree puts forth its leaves at the beginning of the dry season providing a high quality browse for cattle and goats. When the leaves fall at the beginning of the rainy season, they enrich the soil with humus, nitrogen and the mineral nutrient elements.

Data show substantial increases in organic matter, nitrogen, calcium, and phosphorus in soils under gao, compared to nearby soils outside the tree canopy.

One of the major constraints to expanding tree planting may be the national forestry code. According to Thomson,* villagers are reluctant to plant and care for trees because trees are the property of the government and controlled by the Forestry Service. Even if a villager engages in the work of tree production, he is not necessarily entitled to the fruit of his labor without a permit from Forestry officials. In the case of his own home compound, the villager has control of his trees. As a consequence, Thomson noted that planting, watering and caring for trees is willingly done by family members inside their compound. However, trees growing on village fields, grazing lands or woodlots fall under the control of forestry officials.

The solution to the problem is not simple. Determining the proper degree of control over such an important resource as trees, that maximizes production and use of the resource for the common good, must be given careful consideration. It is doubtful that complete individual freedom of choice on forestry use would be appropriate, and we would not advocate that. On the other hand, the need exists to stimulate further tree production by villagers. Certainly the problem deserves further study, if forestry conservation and reforestation are to succeed.

*Dr. James T. Thomson, personal interviews, December 1979.

III. THE EXISTING PRODUCTION UNIT

III.A. General

The general description that is most often given of the farming system in Niger is the small holder farmer who grows crops predominantly for home consumption. Mechanization is almost non-existent and these subsistence farmers cultivate primarily rainfed cereals of millets and sorghums with family labor. The basic production unit is the nuclear family of about seven members and farm size is determined by the amount of labor available to grow crops during a short rainy season. It is assumed that each family possesses a few animals, particularly small ruminants, for meat and sale. In some areas small fields of peanuts or cotton are grown for cash income. In this ideal type, sales of cereals are restricted to years when production exceeds family consumption requirements.

We believe this view of the farming system in Niger is much too simplistic, implying a traditional system that has changed very little over several generations and homogeneity across all farms. Family stability is assumed and an egalitarianism is implicit. From various studies undertaken it is evident that these conditions do not hold, and that increasingly, both subtle and dramatic changes are occurring in the rural areas of Niger.

III.B. Farming System

Although there is a paucity of information with which to assess the entire agricultural zone, studies in certain areas show the tendency for "traditional" producers to adjust to changing conditions (Volume II.D, p. 23). One of the most significant changes of the past two decades can be attributed to the increasing population pressure on available land resources.

Maintaining land fertility has been predicated on a system of long fallow. Natural regeneration of soil fertility by allowing exhausted soils to revert to bush fallow has been long practiced in Niger. The length of time in bush fallow is determined by the availability of other land for crops and the time required for natural

regeneration to take place. Although still widely practiced, in some areas the time in bush fallow has been greatly reduced or even eliminated as a result of the need to grow more foodcrops. In addition, many soils unsuited for cultivation because of slope, erosion conditions, shallow soil or other natural limiting factors, have been planted (Volume II.D, p. 9).

Further adjustments appear in the declining acreage planted in "cash" crops. Cotton and peanuts production have suffered in the face of growing demand for land to grow food. Interestingly enough, farmers have expanded production of cowpeas which have exhibited increasing yields as well as increasing prices. Cowpeas are both a "cash" crop and a ready food reserve.

Farmers have also intensified cultivation where feasible, as has long been evident in the farmer constructed irrigation areas along the Komadougou and Niger Rivers. More recently intensification has been demonstrated in the gardening activities in the Maradi and Zinder regions or in the densely populated Dalloh Bosso of Niamey Department.

As land area per person diminished and the fallow period was shortened, more and more farmers tried to arrest the declining yeilds by using animal manures and household wastes to maintain soil fertility. The Nigerien farmer knows that organic and mineral wastes from the household, sweepings from the village streets, manure from animal pens, plant residues from the threshing floor and dried night soil, are good fertilizers. These organic and mineral wastes are usually used in largest amount on fields nearest the village, with less and less used at increasing distance from the village. This system recycles the organic matter and its fertility elements back to the soil including a funneling onto the cropped areas of some of the minerals and nitrogen in the vegetation eaten by animals grazing a larger area, some of which may never be cropped, such as permanent grazing lands. For this system to work most effectively there must be collaboration between the sedentary cultivator and the livestock owner, or the cultivator must have a few animals for meat, milk or traction.

The value of animals as a soil fertility resource is more and more appreciated (Volume II.C, p. 10; D, p. 25), but the diminishing of fallow land means less grazing land and fodder for livestock. Thus, when the need for and demand for livestock increases, the ability to maintain animals decreases. Fertility declines, yields decline, and to compensate, farmers cultivate more land, further exacerbating the problem (Volume II, D, pp. 24-25).

Farm size and organization vary greatly in Niger. Data from the World Bank indicate that in the Dosso Department the average farm size is 13 hectares. Of these, nine hectares are planted each year by a family of seven persons. About 75 percent of the planted area is harvested, allowing the poorer fields to grow up in weeds. Again, this data is aggregated over a large geographic zone.

Evidence from Maradi and Zinder departments indicates a wide range of farm size. The general tendency appears to be smaller farm sizes in the heavier rainfall zones. However, even then, the deviations around the norm are quite large (Volume II.D, p. 21).

It has generally been held that labor bottlenecks at certain critical periods, such as weeding time, determine the acreage cultivated by each household member. In areas where land is not constrained it is the most general argument for advocating animal traction.* In the few studies done in Niger, it does not appear that labor availability is the only determinant (Volume II.B, pp. 23-25). Certainly the differences of labor input per hectare indicate that much more thorough research needs to be done on farm management in Niger. Decisions concerning the allocation of resources are not catalogued but we can draw some implications from differences between farms.

Labor input per hectare of cereal production varies from a low of 29 days to a high of 175 days (Volume II.B, p. 23). Area per worker is more closely correlated to hours of family labor input per hectare (coeff. cor = -.69) than was farm size to available labor or outside hired labor in some studies (Volume II.B, pp. 24-25). This suggests that (1) availability of land is more significant than availability of labor in determining farm size; (2) the need for cash income forces some families to export labor from the farm, limiting the amount of labor available to family holdings;

*It is interesting that studies do not always show that animal traction removes the labor bottlenecks. Sleeper, for example, notes: "The primary constraint to increased yields and area cultivated is the inability of the farmer to perform ox-drawn weeding, either because of the lack of proper weeding attachments, lack of skill and training on the part of the farmer, or the lack of training or poor condition of the animals." See Jonathan Arthur Sleeper, "An Economic Analysis of the Role of Ox-plowing and Cattle-feeding in the Stratification of West African Livestock Production," Working Paper #4 of the Livestock Production and Marketing in the Entente States of West Africa, University of Michigan CRED, pp. 98-99.

or (3) some individuals place a much higher value on the opportunity costs of other uses of time. An important determinant of farm size and area per worker appears to be rainfall zones (Volume II.D, p. 21) which is logical if one assumes yields decline as rainfall declines, thus more acreage is required to produce needed food (Volume II.B, p. 8). In any case, it should be noted that micro-studies invariably show much greater areas cultivated per worker than government estimates (Volume II.D, p. 25; B, p. 9).

Data on livestock holdings show few observable patterns in terms of zones (Volume II.D, p. 22). Perhaps most significant are the large variations in livestock holdings. This suggests that intra-village differences in holdings are much greater than inter-zone differences. In fact, considering the ownership patterns within families (Volume II.D, pp. 24 and 40), economic decisions related to livestock may not be related to other farm considerations. For example, the economic independence of family members, the requirements for liquidity of assets, or the choices for holding savings may be key factors rather than land holdings or family requirements for consumption of animal products. In any case, a typical farm livestock holding is not indicated.

III.C. Rural Cash Economy

For the Nigerien farmer the need for money has increased rapidly over the past few decades. Beginning with the introduction of money in the colonial period, and the requirement to meet certain obligations, such as taxes, with money (Volume II.D, pp. 1-10), the monetarization of rural life has grown to encompass nearly every facet of the village economy. Even though the major tax burdens were eliminated in the 1970's, money flows in family economics has not significantly diminished. Per capita household expenditures range from \$80 (U.S.) to \$120 (16,000 to 24,000 FCFA) (Volume II.D, pp. 10-13). Significantly, the major share of these expenditures are for consumable items. Over 3/4 of all expenditures appear as household expenses with less than 1/4 as production costs (Volume II.D, pp. 12-13). Even more important is the low level of capital investment, which, excluding livestock, is less than one percent of total annual expenditures.

Although the low level of capital investment in the traditional sector may be the result of the need for money for other purposes (Volume II.D, p. 15), it

probably more correctly reflects the extremely low returns to investment that are expected by the farmer (Volume II.B, pp. 21-22, 47; D, p. 16). The fact that livestock purchases represent over ten percent of total cash outlays supports the concept of livestock holdings being the traditional savings mechanism. It also probably indicates that returns in livestock are significantly greater than in crop production (Volume II.B, p. 28; D, p. 71).

Even given that capital investment in crop production has been low, it does not follow that output has been stagnant. In the 1960's production continued to expand, particularly for cash crops (Volume II.F, pp. 6, 72; D, p. 23). This, however, has generally been the result of expanding acreage (Volume II.D, p. 23). Neither capital investment nor production inputs to raise yields are evident in the major areas of the cropping zones. Occasionally, capital investment in small irrigation structures for high intensive gardening are noted. This reflects the willingness of some farmers to invest money and labor when the expectation of high returns is available.

In Dosso, the World Bank estimates the per capita income of \$135 (U.S.) annually. Livestock contributes about twenty percent of this income. In the Zinder region cash expenditures as noted above would be comparable. However, for Zinder this would imply almost 100 percent monetarization of production, which seems unlikely (Volume II.D, p. 21). Data from Zinder indicate \$52 (U.S.) of per capital income originates from crop production (Volume II.D, p. 34), meaning over fifty percent is derived elsewhere. If twenty percent can be attributed to livestock, then over thirty percent must be derived from labor employment, handicrafts, commerce or other activities. This indicates a family economy quite removed from the production for consumption postulated in the general description of the subsistence farmer.

III.D. Family Production United

The family as an institution for organizing labor and economic activities or making basic production decisions appears to be going through a metamorphosis (Volume II.D, pp. 27ff). Again, population pressure on land and the need for money appear to be major determining factors in the change occurring.

The advantages of the large family are much less assured than previously, and in some cases nonexistent. The exchange of labor on family holdings for the eventual

inheritance of their own land is no longer a quid pro quo for young men when family holdings become too small to be economically divided further or when off-farm employment appears attractive. To the head of the household a large family may no longer offer the security and protection that it did previously. This can be particularly true when the family holdings no longer constitute an adequate economic unit to meet the financial obligations to sons or other family members (Volume II.D, p. 31). We do not argue that the degree of change is universal throughout all regions and across all families. Indeed, the richest and most prestigious families in the village were, and still are today, the large families. Social change is occurring, but it is not undifferentiated change.

Apparently, the ability of the family head to produce adequate food on family collective fields is important in maintaining family unity. If adequate food production cannot be assured by the family head then he may be forced to delegate some of his obligations to subordinates, thus weakening his authority. At the same time, the subordinates see less benefit in remaining in a family economic unit (Volume II.D, p. 36).

The decline in productivity appears to be further exacerbated by the changes in the family social unit that are occurring. With less benefits accruing to members of the unit, i.e., less assurance of food supplies, no further need for subordinates to have taxes paid by the family head (Volume II.D, p. 41), and marriage instability (Volume II.D, p. 38), family members are more reluctant to invest their labor in family collective fields. As labor time invested in cultivation appears directly related to yields (Volume II.B, pp. 24-26), with less family labor input, production on family fields declines which in turn offers even less benefits to subordinate members.

III.E. Land Tenure Systems

III.E.1. Traditional and Islamic

Current land tenure practices in Niger are a mixture of the traditional African, Islamic, and commercial systems. The basis of the present system was communal, where by it was recognized that members resident within the village had the right to use as much land of the community as they required for their needs, but in no sense could the land be alienated from the community. Usufructuary rights to land were

held by the family while the village head maintained the traditional community control of land. Land was allocated by him to strangers settling in the community and to resident families who required additional land. Land only reverted to the community in the event of abandonment. Normally at death, land was transferred to the heirs of the cultivator.

Islamic law (the canon law of the Shariya) is also applied in controlling land tenure. Under the basic laws of inheritance, the properties of the deceased (including land over which there is right of usufruct) are divided following the highly complex Maliki Shariya formulae governing inheritance proceedings.

An important aspect of the Muslim code is that it bestowed inheritance rights upon women, and in many areas has enabled land to be passed down through the female line. In Niger, however, it usually is through gifts of land and not through the formal inheritance proceedings that women obtain rights to land.

Traditionally, as the household expanded, portions of the lineage created would eventually split off to form new households which grow into new lineages (the segmentary process). The groups splitting off would move to an unoccupied neighboring area and found a new village. It was through such a splitting off process that the Nigerien countryside became settled; the pressure on the land manifested itself in a continuous extension of cultivated land towards the north. This process continues today, moving the cultivated zone further north each year.

III.E.2. Commercial Land Transactions

The resulting demand for land gradually transformed the right of usufruct into a property claim which today is increasingly commercialized. Although not yet a "fee simple" title to property, commercial transactions are beginning to take on aspects of the fee simple process, and in most cases the title transfers are recognized by the community. The seller is not obliged to consult any of his relatives, and indeed, sales sometimes occur in the face of bitter opposition from sons (Volume II.D, p. 67).

In addition to land sales, transferring rights to land through gifts and loans is very common (Volume II.D, p. 68). The system of pledging fields (jingina)*, where one transfers the right to use the land to another party in return for a money loan,

*In Hausa

is also taking on increasing importance. The creditor (and his heirs) farm the land until the loan is repaid. The creditor is entitled to claim the farm failing repayment of the sum borrowed. Since many of the borrowers are marginal farmers, it is not unusual for them to be unable to repay their loans. Pledging thus often becomes the prelude to outright sale, although he who gave up the field always has the hope that one day it will be redeemed, either by himself or by his heirs.

The most common type of tenure remains the paternal inheritance, but in some areas over forty percent of the farmland was acquired through other means (Volume II.D, p. 70). The higher the density of population, the higher was the incidence of commercial transactions. This suggests that land will increasingly enter the market system as population pressure augments over the next two decades.

Although the market oriented circulation of land tends to increase the vulnerability of the poorest and the advantages of the rich, it is important to note that the internal accumulation of land within the village itself is not a process that is very far advanced. Except in certain areas for certain types of land, one does not find large farms that have been constituted through outright purchase of land. There is evidence to suppose that the commercialization of land is increasing. When land is acquired it is done usually in order to complement one's inherited estate, not to accumulate substantially above and beyond one's subsistence needs. Capital is better invested not in agriculture, where profit making capacity is low, but in more dynamic sectors, such as trade.

For land inherited, received as a gift, or bought, there appears to be nothing to discourage the farmer from investing in the land. In the case of loan and pledged land, however, the farmer is only sure of the crops planted in the current year. In such cases, capital investment in land improvement (such as manuring) is almost nonexistent (Volume II.D, p. 71).

As land becomes more scarce, access to good farmland becomes less equal (Volume II.D, p. 25). Spatial organization around villages appears as a series of concentric rings, with the inner rings the most manured. Less and less manuring and consequently lower fertility maintenance occurs as one moves away from the village (Volume II.D, p. 25). Some families control no land in the inner rings, and others, only small amounts (Volume II.D, p. 26). In Hausa country, where women farm their own fields in the rainy season, access to land by women appears to be more difficult as pressure

for land increases (Volume II.D, p. 35). According to the World Bank's Dosso study, in Djerma country, women normally do not participate in rainy season cultivation. This seems a highly questionable statement and it is doubtful if it is supported by detailed studies. In any case, in Djerma country the effects of pressure on land are unknown. Djerma women normally do cultivate small gardens during the dry season, but we are unaware of the implications, if any, that shortage of gardens may have on their economic or social position.

III.F. Women's Position in Social and Economic Systems

III.F.1. Overview

The position of women in the rural areas of Niger appears to have undergone some change in the past two decades. That change is linked to both demographic forces as well as the process of modernization. Modernization is both active, in the sense of direct activities of development projects, and passive, in the sense of economic and social forces such as increased monetarization of rural life, shifting economic opportunities or transport and communications development. It is not surprising then that the degree of change varies greatly throughout the country depending on the extent of those influences in a given area (Volume II.E)

The studies that have been undertaken have seldom addressed specifically the role of women in rural Niger. Even those studies that have been accomplished have tended to be concentrated in the Maradi and Zinder areas. Often those studies have not been well enough defined to treat women specifically, so only by extrapolation from the more general cases or inference can one analyze women's position in the general rural milieu.

III.F.2. Structures of Landholding

In Hausa country women gain access to land either through allocation by their husbands or through gifts and inheritance. In the former case, the husband retains rights to the land so that it reverts to him upon divorce. As divorce is quite common and appears to be increasing in frequency (Volume II.D, pp. 38-39), it is not surprising that men allocate their least fertile fields to their wives and the women are not inclined to invest in the land (such as manuring). Land obtained by women through gifts and inheritance can be significant. As much as 22 percent was obtained

in this manner according to some studies (Volume II.D, p. 70). However, even though rights to this land are inalienable, there is no evidence that capital investment occurs. It does appear, however, that yields on women's fields in general are significantly below those on men's or family fields.

As availability of land declines due to population pressure, one could hypothesize that it will become more difficult for the husband to allocate land to his wives and still maintain adequate production to meet his own social obligations. However, the data is insufficient to either support or reject the hypothesis. In fact, some studies indicate that control of land by women can exceed one-third of village acreage (Volume II.D).

III.F.3. Income and Liquidity

The high divorce rate coupled with an insecure land tenure has also pushed women into activities of high liquidity. Investment in small ruminants is particularly noticeable (Volume II.D, pp. 40-41). This "walking capital" can be taken with her upon divorce, and is a ready source of cash when needed.

The need for cash to meet personal social obligations has also manifested itself in the increasing trade in processed foods in which women engage (Volume II.D, pp. 47-48). By transforming the production of their land into processed food for cash sales, the women are maximizing the cash income from their labor. Although both women and men buy processed food, the relatively larger expenditures by men (16,620 FCFA per year for men versus 12,980 FCFA for women) indicate a cash flow toward women (Volume II.D, p. 47). This surplus is often invested in livestock which helps assure the women an economic independence from land holdings.

III.F.4. Project Interventions

The direct intervention of development projects in agricultural production would appear on the surface to be heavily biased against women. In most cases, yield raising technology through the cooperative system is in the form of credit for production inputs. The major concern of UNCC is to satisfy the demand for credit of the village as a whole, while the distribution of that credit within the village remains the affair of the village leaders and cooperateurs. The assumption here is that the production unit as a whole will benefit from improved inputs. As was seen

in the above discussion of the production unit, however, the presumption of the cohesiveness of the unit as well as family entente is misleading. Because men control village cooperatives and control over production from land is strictly determined, production inputs rarely if ever are used on women's fields (Volume II.E).

It appears to be equally true that technical information from official services is seldom addressed to women. This is not surprising considering that service agents are all male with the exception of animation and health. In the latter two cases agricultural production carries minimal emphasis (Volume II.B, E).

Although the structure of the system appears to be heavily biased against women, in reality it is less pronounced. This is not because of the effort of productivity projects to train young families as a unit, although in the future this could be significant in correcting the imbalance. It is rather because villagers in general, both men and women, receive little in terms of inputs. That fact can be easily verified by the statistics of inputs on the national level. Total utilization of fertilizer in 1977 was only one-third kg/ha actual nutrients for N and P₂O₅ (Volume II.C, p. 11). In the same year credit for fertilizer, seed and material extended by UNCC averaged only 59 FCFA per hectare cultivated (Volume II.G, CNCA report, p. 6). Thus unequal access to inputs occurs for men as well as women. As quantity of inputs such as fertilizer and credit increases, however, caution must be exercised to prevent a growing inequality of access to those inputs. This is necessary, if for no other reasons, because the crop production goals cannot be met if as much as twenty to thirty percent of productive land is excluded from modernization.

IV. THE GOVERNMENT OF NIGER STRATEGY FOR THE AGRICULTURAL SECTOR

The Government of Niger's strategy for food self-sufficiency over the next two decades is predicated upon productivity gains on presently cropped acreages (Volume II.B, p. 1). Coupled with expansion of irrigated acreage, dry land productivity is to be increased through a series of geographically specific "Productivity Projects" that are aimed at modernizing the Nigerien farmers by 1990 (Volume II.B, Annex A). This modernization process is to be centered around the use of selected varieties of cereals and the use of chemical fertilizers, gradually incorporating animal traction and eventually reaching a full livestock/cropping integration. Starting in 1975, this strategy was intended to reach ninety percent of Niger's farmers by 1990.

Analysis indicates that the GON strategy is not being met and cannot reach its target in the planned time-frame (Volume II.B, p. 13). The strategy was intended to avert environmental degradation and soil depletion inherent in the northward movement of cultivation and reduction in fallow. It appears to have had little effect on either. In fact, the increase in food production that has been necessary to meet population growth has probably largely been met by expanding acreages (Volume II.B, p. 13; F, p. 46).

The GON strategy is a reasonable approach to meeting food needs. It also appears that technology in cereal production in Niger, although not having the elements of a green revolution, is adequate to produce incremental food requirements (Volume II.C, p. 13). Commitment by foreign donors as well as the GON budget do not appear to be lacking. The fact that the strategy has not been translated into higher yields at the farm level is largely attributable to the lack of pre-conditions of the strategy and the uneven implementation of associated activities. The introduction of new cereals varieties and widespread use of chemical fertilizers assumed that appropriate varieties were available for distribution throughout the country, that credit and distribution systems were in place for widespread distribution of fertilizers, and that extension techniques of proven merit were available to reach large numbers of farmers. It appears that these conditions did not hold in 1975 and may not until after the present Five Year Plan (1979-83).

The GON strategy is only a conceptual framework for food production. It is not a blueprint for implementation. The production targets are aggregated at the most general level with associated input requirements. Translating GON policy into operational implementation plans has been left to the specific interventions such as the productivity projects, National Cereals Project or irrigation schemes. These are often heavily influenced in design by donor agencies (Volume II.B, Annex p. 2). Thus each intervention has its own unique characteristics of organization and management and emphasis is differentially placed on the aspects of rural development.

Although integration is supposed to be the guiding principle, particularly in the productivity projects, the mechanisms to insure its occurrence are not very effective (Volume II.B, Annex A). This problem is compounded by the fact that most field workers are directed by national Services each with its own objectives. These objectives can, at times, overshadow specific project goals and undermine attempts to coordinate the development effort.

The present development projects represent a more serious effort to improve the rural sector than has previously been the case. Given that integrated development is a very recent emphasis in Niger, it is not necessarily inefficient to use different approaches. It is unfortunate, however, that some of these techniques were not undertaken in smaller, more controlled situations, so that systematic appraisals could have been made of the various approaches undertaken. Regardless of the large scope of these efforts, more thorough evaluations should have been done.

There is a serious lack of information on past efforts (Volume II.B, p. 40). Needed information includes, for example, what type of administrative structure contributed the most toward integration or operational efficiency, which approach to agricultural extension obtained the greatest farmer receptivity to technological change, and at what cost, or by which village organizational structure self-management was most enhanced. Existing information is insufficient to permit the design of a coordinated effort that is needed to reach the objectives of the GON strategy.

Finally, the level of coordination at the national level is, on occasion, insufficient. Lack of coordination occurs both between agencies and across national policy objectives. In some cases, national services are in direct competition for scarce resources, and duplication of functions and gaps between functions occur (Volume II.B,

Annex A). Gaps are particularly obvious in extension service activities or in the lack of farm testing of agricultural techniques. Policies are sometimes based on hypothesis rather than research. Animal traction, for example, is being promoted when social, economic or technical research has not been performed for its justification (Volume II.B, Annex A).

Policies can also be contradictory, for example, through holding down food prices while stimulating food production (Volume II.F), or attempting to rebuild livestock herds in the face of declining terms of trade between cereals and livestock. Sometimes the political underpinnings of policy are inconsistent with technical or economic realities of the overall strategy. This is evident in the desire to cover every habited zone of the country with a productivity project even though this may not make economic sense or contribute much to the food self-sufficiency goals.

Lack of policy further undermines the overall objectives. For example, there is an absence of long-term policy on subsidies and producer prices which affect both producer decisions and the ability of government agencies to initiate long-term planning. Policy statements are lacking concerning seed production, grain reserves and the involvement of the private sector in various aspects of the production system.

In essence, then, Niger has a well-reasoned general strategy for food self-sufficiency, yet if present interventions are to have a major impact on crop yields, serious study must be given to practices and policies aimed at the farmer. In order to avert food shortages that will occur when arable land is completely occupied, production techniques will have to change. The present rate of diffusion of technology is much too slow to bring about a generalized change in production techniques. If the rate of diffusion of themes is not improved by 1985, it will be extremely difficult to meet Niger's food needs during the 1990's.

V. CEREALS

V.A. Demand for Cereals

The major underlying factors affecting the patterns of demand for grains such as millet and sorghum, which are used almost entirely for human consumption, are (1) population growths and shifts, and (2) the level of and changes in per capita consumption. A number of serious constraints prevent an in-depth evaluation of past, present and future cereal demand. These constraints include incomplete population census data, substantial variation in different per capita cereal consumption estimates, and discontinuous cereal price series (Volume II.F).

Calculated estimates and forecasts of past, present, and future population levels exhibited a growth rate of 2.67 percent which closely parallels the 2.7 percent growth rate used by the GON. Equally important is the population shift occurring between urban and rural sectors. If the trend continues almost 2.8 million people will be urban dwellers by the year 2000. Current calculation reveals that of the 602,000 urban population in the 1977 census, approximately 69.1 percent are urban dwellers without means of crop production. If this same level continues, slightly less than two million people out of a total of 9.4 million in the year 2000 will be total consumers. Given the shifts of population groups as well as the high cereal consumption levels of the 1960's, the per capita consumption range is from 283.6 kilograms in the early 1960's to a current level of 250.0 kilograms per year (Volume II.F, pp. 2, 7).

Calculated demand for cereals for rural sedentary, urban and nomad groups suggest that demand will grow by an annual increment of 39.5 thousand metric tons over the 1980-1985 period, reaching an annual increment of 58.8 thousand metric tons for the 1995-2000 period (Volume II.F, p. 11).

V.B. Supply of Cereals

Niger's production of cereals exceeded consumption in eleven of the nineteen years since 1960. Carryover stocks in the 1960's supplied food security that often approached one year's consumption. Deficit years in the early 1970's reduced domestic stocks, so that even with food aid and imports, carryover stocks were eliminated by 1975. Production in the last half of the decade has met consumer requirements and permitted some stock build-up. Present carryover stocks of 300,000 metric tons, however, constitute barely one-fourth of annual requirements. A poor crop year such as was seen in 1968, 1973 or 1975 would entirely eliminate these reserves (Volume II.F, pp. 9-10).

As national requirements rise from 1,300 thousand metric tons in 1980 to 1,802 thousand metric tons in 1990 and 2,353 thousand metric tons in 2000 (Volume II.F, p. 11), supply will depend upon availability of land to put into cereals cultivation and actual yields. If yields per hectare are as low as some reports indicate (Volume II.B, p. 26, Note 13), then seven million hectares of land will be cropped in cereals by 1990.

More importantly, requirements of the non-food-producing sector (urban and nomad) will rise from 319 thousand metric tons in 1980 to 465 thousand metric tons in 1990. Supplying this volume will be heavily influenced by the market system.

V.C. The Marketing System

Niger has a multi-channel cereals marketing system typical of many developing nations. The marketing channels can be categorized as official and traditional.

According to Nigerienne law, the OPVN* constitutes the official marketing channel for cereals for which it is given a monopoly on marketing. Theoretically, private merchants are not involved in the grain trade. However, most of the volume of cereals marketed moves through the traditional marketing channels via private traders or local markets to the consumer (Volume II.F).

No private sector statistics exist. Traders are naturally reluctant to release information and the GON denies any knowledge about the private trade. Essentially,

*OPVN (Office des Produits Vivriers du Niger)

four types of cereal merchandisers operate in the traditional marketing system:

- (1) The assembler, who visits various village markets and buys small quantities of cereals;
- (2) The local transporter, who may or may not be the same as the assembler, whose function is the movement of cereals to a regional market;
- (3) The wholesaler, who may function also as a transporter, moving larger quantities of cereals between market areas; and
- (4) The retailer, who operates a stall in an urban market, purchasing cereals in bulk from the wholesaler or surrounding local village markets.

The predominant feature of this system is the high degree of fragmentation. The number of traders in the market is apparently very large. Very few traders seem to handle more than 1,000 sacks of grain per year. More importantly, cereals trading appears not to be the major commercial activity of these traders; rather it is a sideline. That this activity is practiced as a sideline indicates a willingness on the part of the trader to assume risk in return for what is suspected to be a rather narrow transaction margin. A large volume of traders' total profits comes from other commercial ventures in consumer products (Volume II.F).

V.D. Market Volume and Prices

No data exists on the volume of millet and sorghum that moves through the marketing system. The only recorded data are OPVN purchases on these grains.

To determine what the minimum market volume would most likely be, a surplus/deficit balance sheet was constructed for 1966 through 1979 (Volume II.F). This indicates a very stable level of market flow through 1970. With the coming of the drought, market levels increased both in absolute value and as a percentage of available supplies, reflecting the draw-down of stocks as well as lower production.

Since the low point in 1975, market volumes have stabilized and appear to have leveled at an increasing trend reflecting increases in urban population levels. More importantly, these calculated levels indicate that the marketed quantities are substantially larger than has been assumed. The division of market volume for OPVN and the private trade, as calculated, indicates that OPVN can most likely expect to capture ten to twenty percent of the market.

Given the comparison of open market and OPVN fixed prices, an expected farm gate price was calculated. The farm gate prices throughout the period are higher than the OPVN price with the exception of 1974. In that year OPVN captured more than twice its usual share of the market.

The OPVN official sale prices have had little impact on open market prices, which have consistently increased since the late 1960's. The pricing levels of OPVN purchases and sales indicate that OPVN has been a price follower of the open market, rather than a price leader (Volume II.F, p. 15).

Market prices seem to be correlated to market volume from 1966 to 1972, thereafter diverging as drought conditions reduced carryover stocks, and therefore available market supplies, as producers attempted to reserve cereals for needed consumption. The latter years, 1975 to current time, illustrate only a slight rise in market volume in the face of tremendous price increases. This seems to illustrate that there is some security cereal level required by the producer (Volume II.D, p. 58). As the producer builds carryover stocks, market volume increases very slowly. This is further emphasized by the GON's action in 1977 of discontinuing the head tax (Impot Minimum Fiscal). This has reduced cash flow needs of the producer and enabled the producer to attempt to increase his security food reserve at a faster rate. Studies have shown that over seventy percent of the grain sold in some villages prior to 1977 were sales made to obtain tax money (Volume II.D, p. 51).

Production of cereals has not been responsive to price over the 1961 to 1978 time period (Volume II.F). Since production is not responsive to price, the major current constraint in cereals marketing is one of supply availability: the lack of the technical ability to produce in relationship to market demand.

There appears to be strong movement of price as carryover stocks are depleted and producers once again attempt to build cereal reserves. However, the reverse is not necessarily the case, since carryover stocks are the result of the producers' need to develop a food reserve level of some given size (Volume II.D, p. 60; F, p. 24). The market trends noted above are national and inter-regional aggregates. Grain sales within villages appear to be much more active (Volume II.D, pp. 49ff). However, the notion of a peasant who markets his surplus production is misleading (Volume II.D, p. 49). Major grain sales occur, but it appears that in most cases

they are done by deficit producers. Surplus producers often are grain buyers within the village. They buy either to build up stocks or for resale during periods of high prices (Volume II.D, pp. 49-57).

The fact that large quantities circulate within the village is not inconsistent with a non-price responsive supply curve on the national level. In fact, it appears that those who sell must sell at any price, and those who are procuring either have ample funds to build stocks even in the face of high prices, or they are certain of high profits later in the year. Those who buy at high prices during the three months preceding harvest (soudure) are usually those who have sold earlier at low prices. The inter-village movements go virtually unnoticed at the national level. A study of price responsiveness at the village level is needed to complete the picture.

V.E. Office des Produits Vivriers du Niger (OPVN)

The OPVN, under the Ministry of Economic Affairs, Commerce and Industry, was established in 1970 by the GON as the official marketing channel for grain. By law, this organization is entitled to a monopoly of the grain trade. The objectives set forth for the OPVN were:

- (1) To organize marketing of local food products (millet, sorghum, and rice) by:
 - (a) intervening in the market place and
 - (b) constituting regulatory stocks to stabilize farm and consumer prices.
- (2) To provide for a food supply during the off-season and to balance supply and demand between Départements.
- (3) To attain food security by:
 - (a) forecasting resources and needs,
 - (b) proposing programs of storage, import, and export, and
 - (c) participating in food aid programs and implementation of same.

The underlying reason for the establishment of the OPVN appears to be a concern on the part of the GON over the capacity of the free market to foster a subsistence level production of basic food crops. In the free market situation, it was assumed, farmers had no prior knowledge of price. Also, it was widely believed that one of the reasons for the periodically occurring food shortages was the inefficiency of

the open market system (Volume II.F). Under the existing system, each year an interministerial national cereals committee sets the buying and selling prices for cereals. OPVN enters the market sometime after harvest, and in conjunction with different intermediaries, buys cereals.

The 1970 through 1972 pricing structure used regional sales prices for millet, which reflects the necessity of moving purchased cereals long distances. However, this was discontinued in 1973 and the marketing margin remained extremely small until 1976 and 1977.

In the 1977 crop year, OPVN had to raise its official price for millet from 25 CFA/kg to 30 CFA/kg, and then still further to 50 CFA/kg in an attempt to achieve procurement targets. Apparently, OPVN had to offer even higher prices than the official level (Volume II.F, p. 30).

The marketing margins, when compared to OPVN's budgeted operating costs, indicate a sufficient spread between official purchases and sales prices. Whether the budgeted operating costs are a true reflection of the actual costs remains unknown.

The organization of official marketing channels has undergone numerous changes during the OPVN's life span. Undoubtedly, this constant change has created considerable confusion among producers. OPVN has attempted to target its purchasing activities upon the major producing Départements. There are some noticeable exceptions to the OPVN purchasing targets and production levels which have apparently prevented OPVN from concentrating more heavily on the surplus districts.

Sales to consumers are made from (1) primary centers of OPVN, (2) secondary centers of OPVN, and (3) OPVN warehouses. Sales at warehouses are reserved for government employees. Sales at secondary centers are open to all except merchants and private companies. Sales by the primary centers of OPVN are operated through neighborhood chiefs in large cities and village chiefs in small cities. It is clear there is a bias in distribution. Specifically, it is evident that the distribution pattern is extremely slanted toward the Département of Niamey (Volume II.F, p. 34).

V.F. Storage of Cereals

Cereals are typically stored by producers in circular granaries constructed from banco* or thatch made from millet stalks. Both structures are supported above

*mud brick

ground by stone or wooden supports to prevent insect and rodent attacks. Grain is bundled and stored unthreshed until needed for consumption or sale. It appears that storage loss in cereals under these types of storage conditions is in the range of five to six percent (Volume II.F, p. 38).

Warehouse storage is used by OPVN and undoubtedly a few grain traders. These warehouses are usually banco or concrete structures with metal roofs. Since its inception, OPVN seems to have demonstrated a reasonably good ability to handle relatively large amounts of grain products.

There is no available loss data on OPVN cereal storage. The only available numbers indicate a very low level of losses. However, other survey reports indicate that the management of storage procedures needs to be improved to prevent loss (Volume II.F, p. 38).

Current available storage capacity by Département, compared to departmental purchasing and sales patterns, reveals that the positioning of warehouses has no relationship to purchasing and sales activities. OPVN total storage capacity is presently 82,200 tons.

VI. CASH CROPS

VI.A. Marketing Organizations and Channels

The principal cash crops produced in Niger are peanuts, cotton, and cowpeas. Peanut and cowpea marketing is controlled by a government organization, SONARA.* Cotton is marketed by a quasi-public nonprofit French organization, CFDT.

SONARA, created in 1962, controls the export and domestic oil mill marketing of peanuts as well as the export of processed products from oil plants. In 1975, the responsibility for the export marketing of cowpeas, previously categorized as a food crop, was transferred from OPVN to SONARA.

In principal, SONARA has monopoly power over the buying and selling of peanuts and cowpeas. SONARA follows guidelines promulgated by public law for marketing procedures and price structures. The GON formulates official minimum producer prices and rates of the various marketing services. SONARA purchases peanuts and cowpeas at a minimum (floor) price, including a commission for various intermediaries. The UNCC and private agents are the usual intermediaries. SONARA sells peanuts and cowpeas on the international market and peanuts domestically to Nigerien peanut oil processing plants. SONARA currently operates two peanut hulling plants with 70,000 ton capacity. Niger has three peanut oil processing plants with 130,000 ton capacity.

There is an open market for peanuts for local consumption as well as an open market commercial trade which sells peanuts to SONARA.

The current cowpea marketing channels differ significantly from before the time that SONARA was given the export monopoly. In the past, OPVN made direct purchases from producers, purchases from private traders and purchases through UNCC. Currently SONARA purchases only through UNCC.

*SONARA's ownership is 88.6 percent government agencies and 11.4 percent private. Agencies having participation in SONARA besides the GON are CSPPN, BDRN, UNCC, and COPRO-NIGER.

CFDT has control of all sales and exports of cotton fiber. CFDT is a French nonprofit organization that operates internationally. It has operated via contract with UNCC in Niger since 1959. UNCC acts as an intermediary for CFDT, buying cotton from rural cooperatives and selling it to CFDT. CFDT purchases cotton at a floor price established by methods similar to prices for peanuts. Purchases are made through UNCC since the cooperative network is relatively well established in the cotton growing areas.

Niger's cotton is ginned in five local gins with 20,000 tons capacity. Exports of cotton fiber were approximately the same as production up until 1969. Since NITEX, which subsequently became SONITEXTILE, went into cloth production, it has received a major share of the reduced quantity of cotton marketed.

VI.B. Production and Marketing Trends

The most significant change in Niger's cash crop sector in the last ten years is the decline in the position of peanuts as the main export product and cash crop earner. Yields have been erratic over the latter time period due to drought and parasite attacks. There is no discernable downward trend in yields according to official figures; however, disease has reportedly reduced yields substantially in some areas. The fall in production is attributed to reduced acreage and fluctuating yields of peanuts. As a result, the marketing of peanuts by SONARA has declined to where current marketing volume is less than ten percent of the volume marketed in the middle 1960's (Volume II.F, p. 72).

The export value of peanuts has also declined significantly since the middle 1960's. This is primarily due to reduction in market volumes. Market volume fell by almost ninety percent since the early 1970's, while world prices fell by only slightly more than twenty percent. Since 1974, exports of shelled peanuts have ceased and the marketed domestic production has been allocated to Niger's peanut oil processing plants (Volume II.F, p. 74).

The exports of processed products of oil processing plants has followed the same basic pattern as peanut sales to oil processing plants. It is assumed that the difference between output and exported products of oil processing plants was sold into the domestic market. Comparisons between plant output and export volumes indicate either a very low per capita domestic consumption of vegetable oils, a need

to export these products so as to achieve an export/import balance, or a much misaligned finished product marketing system (Volume II.F, p. 74).

The amounts of peanut purchases by SONARA through the UNCC has been well below fifty percent of SONARA's purchases over the nine-year period of 1967 to 1975. Only when total market volume fell to extremely low levels, as in 1976, did the UNCC capture a large share of SONARA peanut purchases. This indicates that, while SONARA supposedly had a monopoly on peanut marketing, its extent of control and possible assistance in peanut production was practically nil (Volume II.F, p. 80).

The production of cotton in Niger increased between 1964 and 1969, with production doubling, to a peak of 12,645 tons in 1969. Since this peak, the trend in cotton production has been one of erratic decline, reaching its lowest level of 3,571 tons in 1973. Production increased after 1973, to 11,100 tons in 1975 and then declined again. The trend in market volumes has naturally followed the same pattern.

The cowpea has been traditionally a staple food crop in Niger. It has exhibited the greatest growth of any crop in terms of production, showing a steady increasing trend since 1961. Over the last decade, exterior demand for cowpeas as well as low cereal production has converted a traditional food crop into a cash crop.

As cowpeas evolved into a cash crop, the percentage of production purchased by OPVN and SONARA steadily increased from 1972 through 1976. Purchases from 1977 were extremely small, which undoubtedly is a result of official pricing levels and only one purchasing channel used by SONARA. The majority of purchases by OPVN and SONARA were exported. These exports increased steadily over time, indicating a strong and growing export market in neighboring countries. The failure to further increase exports in 1977 was the result of purchasing failure (Volume II.F, p. 80).

As noted above, comparing cowpea purchasing channels used by government organizations indicates that OPVN utilized the UNCC, direct purchases and traders, or at least two of these channels during its period of activity, while SONARA utilizes only one channel, the UNCC. It is reasonable to expect that traders did not leave the market, but are now competing with SONARA for cowpeas to export (Volume II.F, p. 80). SONARA, using only UNCC for purchasing, and most probably competing against traders, may not be able to substantially increase purchases. With cowpea

production increasing throughout the country, UNCC, being neither evenly spread nationwide nor effective, may be unable to adequately compete against traders.

The reasons most often cited for the decline in acreage, production, and market volumes of peanuts and cotton are inadequate producer pricing policies and preference for cultivating cereals as a hedge against another severe food shortage. The reason most often given for the increase in cowpea production, in contrast to the decrease in peanut production, is that producers tend to devote more land to cowpeas which can be used as a food crop, as well as for cash crop purposes, so as to protect themselves from another severe food shortage. In addition, cowpeas are most often intercropped with millet and sorghum and therefore are not a direct competitor for land. The factors that limit the expansion of cowpea production are cowpeas susceptibility to insect infestation, particularly if grown in pure stand and storage problems. Cowpea storage is a problem due to insect infestation shortly before harvest. This infestation is then carried into storage. Therefore, farmers tend to sell as soon as possible after harvest due to the possibility of loss in storage.

Analysis indicates that it is undoubtedly true that the major reason for the decline in cash crops was the need for producers either to increase the cereal production area or to spend more time in cereal and food crop production as evidenced by the dramatic yield increases in cowpeas. Other underlying factors that may have aided in this shift are unknown (Volume II.F, pp. 84-86).

VII. GOVERNMENT OF NIGER INTERVENTIONS AND INSTITUTIONS

VII.A. The Agricultural Technology Package

The GON is striving to increase production of millet, grain sorghum and cowpeas by improving the level of on-farm technology. Development of this technology is largely the responsibility of INRAN.* Research, some of it dating back to the early 60's, on crop varieties, soil fertility problems, insect control, and cultural practices, serves as the basis for a single set of general recommendations used in promoting increased production of cereals (Volume II.D, pp. 20ff).

VII.A.1. Crop Varieties

Millet, having a lower water and soil fertility requirement than grain sorghum, is generally recommended for the sandy dunal soils and grain sorghum on the more fertile soils, such as in depressions and valleys with better moisture holding capacity.

P3 Kolo, the most widely recommended millet, was released for planting some eighteen years ago. Since then, it has become mixed with wild millet and other varieties to the extent that in recent variety trials by INRAN it sometimes yielded less than the local varieties. There has been no satisfactory provision for continuous infusion of pure foundation seed of P3 Kolo in an effective multiplication program.

There are other improved varieties of millet competing with local selections. These include CIVT and HKP. CIVT was reported by INRAN to be better than P3 Kolo, but in some areas no better than the best local varieties. It is being multiplied, but seed stocks are less than for P3 Kolo. HKP is being bred for drier areas and is also being multiplied.

*Institut Nationale de Recherches Agronomiques du Niger (National Agronomic Research Institute)

With respect to grain sorghum, selected varieties outyielded local varieties in 1978 at Niamey and Maradi, but local varieties were superior in trials at Diffa and Zinder.

An active breeding program for both millet and grain sorghum is underway at Tarna. Plant breeding is a long-term undertaking with good results often slow to occur. Given the climatic and soils differences in Niger, one should not count on plant breeders developing a "miracle" variety which yields well under all conditions. However, at present P3 Kolo is the only millet variety being actively promoted by extension workers.

Improved varieties of cowpeas include: TN-4-69 adapted to zones of more than 600 millimeters of rainfall, and TN-88-63 for zones of less than 600 millimeters. They are clearly superior to all local varieties.

VII.A.2. Fertilizers

Early research by IRAT* established that on most Nigerien soils, millet and grain sorghum responded to nitrogen and phosphatic fertilizers, but gave no response to potash applications. This finding was confirmed later by INRAN. The fertilizer recommendations below were developed by IRAT, with some modification by INRAN.

GENERAL FERTILIZATION RECOMMENDATIONS

	Nitrogen (urea)***	Phosphorus** (P ₂ O ₅)
Millet	100 Kg/ha	15 Kg/ha
Grain Sorghum	100 Kg/ha	15 Kg/ha
Cowpeas	--	15 Kg/ha
Peanuts	--	15 Kg/ha

*IRAT = Institut des Recherches Agronomiques Tropicales, predecessor to INRAN.

**If the soil has not had a basal dressing of phosphate fertilizer within the past six years, 75 Kg of P₂O₅ from Nigerien ground rock phosphate is recommended. Each succeeding year, 15 Kg of P₂O₅ from triple superphosphate (45% P₂O₅) is recommended as maintenance application.

***In two applications of 50 Kg each.

The phosphate is broadcast on the soil and dug in by hoe or animal drawn cultivator at the time of land preparation. The nitrogen is put on in split applications, 50 kg of urea at the time of the first weeding and a like amount at the second weeding.

VII.A.3. Seed Treatment

Thioral or Aldrex is mixed with the seed prior to planting. The directions for treating seed, if followed carefully, will assure that the farmer will not suffer from improper use of the chemicals. However, there is considerable doubt that proper and safe procedures are always followed in the villages, particularly in the absence of an agricultural agent.

VII.A.4. Spacing and Density

The recommended spacing for millet is 1 m x 1 m, and for grain sorghum 1 m x 0.5 m on soils of the valleys and depressions. Optimum plant density requires thinning hills to three plants. This plant density is based on trials conducted by INRAN several years ago.

VII.A.5. Weeding

At least two weedings are usually required for most crops to prevent competition with plants. Three weedings are occasionally required, depending on the season, crop or local conditions. However, given the labor constraint often found during weeding time, two weedings may be optimal.

VII.A.6. Alternative Technology

The above package (VII.A.1. through VII.A.5.) was modified under research, using no nitrogen fertilizer, but including cowpeas in the rotation. The minimum expected yield increase under those conditions was about 200 Kg per hectare. With two years of legume, the increase could be 400 Kg or more per hectare.

Data also show that improved cultural practices alone (land preparation, planting in rows, spacing hills one meter apart with three plants per hill and two weedings without the use of any fertilizer or a legume in rotation) increase yield about 100 Kg per hectare (Volume II.B, pp. 15-19; C, p. 22).

VII.A.7. Constraints in the Recommended Technology and its Application

The constraints described below may not include all which hinder adoption of improved technology, but they seem to pose the greatest problems. These problems are known by Nigerien officials, and a degree of effort is being made to solve some of them (Volume II.C, p. 22).

- (a) The technology package as discussed above, is based on limited research. Some recommended varieties, for example P3 Kolo, are now known to be no better than local varieties and in some areas, are inferior. Early maturing varieties specifically selected for the 300-500 millimeter rainfall areas are badly needed.

Plant breeding for improved varieties will take years, and in the near future, only existing varieties will be available in amounts large enough for farmer use.

- (b) A satisfactory system for maintenance of varietal purity and multiplication of seed for distribution has yet to be established.
- (c) The fertilizer recommendations have a sameness that would indicate a uniformity in soils, crops and climate that does not exist. Fertilizer trials should be continued, particularly in the different climatic zones, on the major soil group and on different crops. Studies of fertilizer placement might show that the quantity of nitrogen and phosphate fertilizers needed can be reduced by placement of smaller amounts in a localized zone near the hill.
- (d) Fertilizer studies, and other agronomic research such as variety and cultural practices, should be closely coordinated with the Soil Survey Division of INRAN to assure adequate characterization of the soils on which the research is undertaken. This will enable fertilizer and other interpretations to be made with respect to similar soils in other areas.
- (e) Application of the improved technology requires that the production inputs (seed, fertilizers, and pesticides) be available in the villages at the proper time. It appears that lack of timely availability of these inputs has been a serious constraint to generalized use of the whole technology package.
- (f) The organizational structure and manpower charged with bringing improved methods to the villages needs to be strengthened. In addition, agronomists qualified to give training programs to the contact agents and to make periodic supervisory visits are badly needed.

VII.B. Plant Protection--The Use of Pesticides

The Plant Protection Division of the Agricultural Service, Ministry of Rural Development, is responsible for all pesticide use, both on crops and stored grain, and for plant quarantine. That Division has but 250 employees who are responsible for monitoring outbreaks of insects and plant diseases and for carrying out control measures at the farm level. Although plant protection has been undertaken for a long time in Niger, it has only been recently that a major effort has been launched. Canada and Germany have provided technical assistance, commodity support and training in plant protection.

VII.B.1. Aerial Spraying

In 1976, twenty thousand hectares were sprayed in an attempt to control stem borer in millet and sorghum; in 1977, 110,000 hectares were sprayed, mostly to control grasshoppers and locusts; and in 1978, the area sprayed jumped to 330,000 hectares, nearly all of which was to combat the desert locusts. In 1979, there were practically no locusts or grasshoppers. The spray program in 1978 is believed to have been effective in reducing the locust population resulting in minimum damage this year.

VII.B.2. Hazards of Pesticide Use in Niger

Although special efforts are made by the foreign advisors to train Nigeriens in the proper use of pesticides to minimize risks, accidents have happened in the use of the more toxic chemicals. Moreover, a German study on residues remaining on food products offered in the market shows that inappropriate chemicals are being used on food crops, and that proper precautions to avoid dangerous residues are not always followed (Volume II.C, p. 25ff). The overall impact of plant protection on crop production is unclear. A more obvious benefit is in treatment of stored food and seed. An interesting spin-off of plant protection is in increasing the visibility of Agricultural Department workers at the village level (Volume II.B, p. 40).

VII.C. Agricultural Research

VII.C.1. Agricultural Research Policies During the Late 1960's and Early 1970's

Before 1975, because of a lack of trained Nigeriens, agricultural research was obtained by contract with French firms, principally IRAT. Other groups involved were ORSTOM, CFTD, IGN, IRHO and possibly other organizations.

IRAT operated two research stations--one at Kolo near Niamey, the other at Tarna near Maradi. In addition, it operated several field stations as well as a network of field trials. In 1975 the GON, believing that it was in their best interest to take over the direct responsibility for agricultural research, created INRAN and installed a Nigerien Director. During this earlier period, the research policies put emphasis on (a) cash or export crops, (b) improved varieties of the traditional food crops, (c) soils, (d) irrigated crops, and (e) fruit crops (Volume II.C, pp. 28ff).

VII.C.2 Agricultural Research Policies and Programs Proposed for the 1978 to 1983 Plan

Objectives and Organization. INRAN is an autonomous agency under the supervision of the Minister of Higher Education and Research.

The overall objectives of INRAN are "to give scientific and technical support to the problem of rural development, and to plan and carry out research in the different branches of agriculture: ecology, agronomy, animal husbandry, forests, agricultural economics and training."

INRAN has a cooperative program with ICRISAT, at the Tarna station. The FAO is providing technical assistance in soil survey and land classification, and CIDA (Canadian aid program) is cooperating in the plant protection area.

Professional Staff. To operate the facilities listed above, there were 45 professional in 1979 who had roughly equivalent to the U.S. Masters Degree. Of these, fifteen were foreigners. In addition, a much smaller number of staff had an equivalent to the B.S. level (Volume II.C, p. 31).

Agricultural Research Priorities. The principal objectives of agronomic research during the 1979-1983 plan period are:

- (a) improvement of food crop varieties, and
- (b) development or refinement of crop management practices for the food crops in each ecological zone.

Priority is to be given to increasing food crop production. This requires the development of hardy drought resistant varieties. The improved varieties of millet, grain sorghum, corn and cowpeas now recommended sometimes yield less than the local varieties. An accelerated breeding program will be undertaken to produce varieties of millet, grain sorghum, cowpeas and corn which incorporate drought resistant characteristics of local varieties, responsiveness to fertilizers and resistance to diseases.

In view of the spectacular increase in cowpeas production, its importance for both human and animal consumption, its potential for increasing soil fertility, and its value as an export crop, research on this crop will be accelerated.

Fertilizer research will be expanded. Niger's soils are generally low in phosphorus and nitrogen. Past experiments show that millet, grain sorghum and corn usually give significant yield increases when fertilized with these nutrients. Additional research is needed to determine the fertilizer needs of the important crops--and particularly the food crops--in the different soil and climatic zones (Volume II.C, p. 32).

Although priority will be given to research on the major food crops, others will be covered. Research in livestock production, ecology, fruit and vegetable crops, and forestry will be undertaken.

The Rural Economics Department, until now nonfunctional, will be activated. Studies will focus on the structure and economics of farming systems, and the alternative combination of production inputs to determine the most economical set of production factors (Volume II.C, p. 33). This research will be useful as an aid to the development of appropriate technology delivery systems (Volume II.B, p. 14) as well as an aid to the understanding of factors of social change at the village level (Volume II.D, pp. 27ff).

VII.D. Manpower and Extension

Lack of trained manpower is most often cited as the major problem of agricultural extension in Niger. To reach the entire rural population, each agricultural field agent would need to cover fifty villages and about 2,500 farms. Even in intensive zones the ratio of agent to farmers exceeds 1:350. Most of the field level agents throughout the Services of the MDR are not highly trained or motivated (Volume II.B, p. 35).

Assessing manpower needs and resources indicates that it will be several years before manpower requirements will be met (Volume II.B, p. 42). In some cases, shortages will occur for the next two decades. This is a serious concern for the implementation of present and planned projects in the rural sector. It would appear that higher level manpower needs can be satisfied by 1985 with the outputs from the Kolo school* and the university* if these are supplemented by foreign scholarships. This will be critical for the major effort that will be needed to produce adequate food in the 1990's. At lower skill levels it will be virtually impossible to meet manpower requirements in this century if a classical model of extension is followed (Volume II.B, p. 42ff).

Agricultural extension has taken different forms in Niger over the past two decades. The general approach using professionally trained agents has at times been modified slightly by concentrating agents for a specific purpose in a geographical zone. Cash crop production or irrigation schemes have, for example, used this approach (Volume II.B, p. 36). The results have been mixed, but generally ineffective.

Shortage of personnel led to experiments in the 1960's that utilized farmer organizations and farmer agents for extension purposes, generally referred to as "autoencadrement" (Volume II.B, pp. 36-37). This approach has been largely retained in the major ongoing extension efforts. Variations in length of training, selection of farmers or backstopping and support exist (Volume II.B, p. 39).

An approach that incorporated the farmer extension agent, the model farmer as a demonstrator and the development of young people was initiated in the Young Farmer's Training Program. This program, initially financed by USAID in the early 1960's, established Young Farmers Training Centers (CFJA's). The centers were farm

*National Institute for Practical Training for Rural Development and National Agronomy school, University of Niamey.

schools where young men were trained in modern methods of farming in actual practical working situations. The course covered a full cropping year, usually seven to nine months in duration. Training was done in local African languages to discourage graduates from migrating to the urban centers.

Upon graduation from the CFJA's, students were given animal traction units and oxen on credit. They were to return to their villages, and because they would be using modern techniques, they would serve as demonstrators that would have a modernizing effect on other villagers.

Although the program still continues in Niger, it has not been overly successful in impacting on rural areas. The reasons for the poor performance of the CFJA's have not been fully documented, but scattered reports give several reasons. Students were young men with no land of their own; upon returning to the farm the head of household's traditional methods were an inertia hard to overcome. Lack of follow-up visitations by Agricultural agents led to a breakdown of communications to newly trained farmers, failed to supply needed morale support and left no mechanism for reinforcing technical methods to the young men. Finally, the training did not stem the rural-to-urban migration, and may have encouraged it. Many reasons are given for this migration, but probably the most important was the lack of perceived investment opportunities in the rural areas.

Many of the present Productivity Projects use a variant of the CFJA. Centres de Perfectionnement Technique (CPT) or Centres de Perfectionnement Rural (CPR) are a generally lower cost CFJA that recruit young farm couples for a seven to nine month program. Each project uses these centers somewhat differently. In some instances, they become a training and support unit for virtually all rural development activities in their zone. In other cases they are little more than training centers like the CFJA's with women in attendance. What the full function of these centers will be and how they will relate to the neighboring village farmers is still an open debate. It is clear, however, that the cost effectiveness of institutional training for farmers cannot be justified. The centers must be able to produce a multiplier effect in the villages if the techniques of food production improvement are to be extended to the majority of Niger's farmers.

A modification of the above systems has led to the hiring of aides encadreurs. These are primary school graduates who receive a short training and are supposed to

be assigned to perform demonstrations of improved production techniques. The actual assignments of these aides encadreurs vary, and in some cases, they are expected to accomplish tasks for which they were neither trained nor intended (Volume II.B, p. 16).

Extension techniques in Niger have never been systematically evaluated. Therefore, it is virtually impossible to ascertain the correct ratio of agents to farmers, the appropriate training to give agents, the effectiveness of farmer agents or the degree of supervision required. Because the elements that make the extension services succeed or fail are unknown, it is impossible to repeat the successes or avoid the failures of previous experiments (Volume II.B, pp. 40-41).

VII.E. UNCC

VII.E.1. Function and Purpose

The Union Nigérienne de Credit et de Cooperation (UNCC) is a semi-governmental organization that was created in 1962 to promote the cooperative movement in Niger. UNCC objectives were:

- (1) to develop the practice of cooperation and cooperative credit among the rural population of Niger;
- (2) to exercise an administrative, technical and financial control over the organization and administration of rural credit and cooperative societies; and
- (3) to grant short- and medium-term loans.

In 1967 the credit section was separated from UNCC, and put in a separate entity known as the Caisse Nationale de Credit Agricole (CNCA). UNCC remains involved in the farmer and cooperative credit program. UNCC personnel act on behalf of CNCA since CNCA has offices in only three of the seven Administrative Departments.

UNCC has a hierarchical administrative structure to facilitate its geographic decentralization and to establish linkages between its headquarters in Niamey and village cooperative groups. From 1962 to 1964, UNCC had no regional representative and operated directly from its headquarters while maintaining an agent in those areas in which it was most active. Decentralization of its operations began in February 1964. Following an administrative reform of 1965, Department delegations were opened in Niamey, Dosso, Tahoua, Maradi, and Zinder (Volume II.G, p. 3).

VII.E.2. Evolution of UNCC

During the colonial period and immediately following independence, a cooperative movement existed in Niger. At independence in 1960, the Government of Niger committed itself to a policy of planned economic and social development. The colonial system of pre-cooperatives was eventually replaced by a new cooperative system.

The establishment of a cooperative system was a strategy of the Government of Niger to improve yields of crops in the 1961-63 Plan Intérimaire. The plan recommended 27 percent of agricultural investment was to be expended on intensified training of agricultural cadres, establishment of cooperatives and diffusion of modern agricultural inputs in order to raise productivity. An investment of 3.3 percent was designated for the development of cooperatives (Volume II.G, p. 5).

The developers of the Plan stressed that the cooperative structures should provide modern inputs to farmers on credit. Additionally, the government under the Plan sought to improve the service and facilitate the establishment of village level cooperatives until the system could be reorganized under the subsequent Plan.

Cooperatives were to receive emphasis in modernizing or transforming agriculture under the Perspective Decennale 1964-1974 and the Plan Quadriennal 1965-1968. The Government of Niger sought to sensitize farmers to the need for change, for cooperation and to "promote the participation of the population in national development." Rural "animation," which had been introduced under the previous plan, was the mechanism for making the farmers aware of the needed change. Development became a nationwide policy (Volume II.B, p. 38; G, p. 6).

In the reform of production structures, the GON began the replacement of pre-cooperatives by a new system of "development cooperatives." These cooperatives were to play a role not only in marketing but also in facilitating collective investment, input distribution, credit provision, and even in retailing major consumer items. The village-level unit would be the Groupement Mutualiste Villageois (GMV), which in turn would belong to a cooperative, and at an economically viable level, to a development cooperative. The cooperative was to become the basic unit of economic organization in livestock, transport, artisanal, and commercial sectors as well as in agriculture.

The Programme Triennial 1976-1978 called for the expansion of the cooperative system. This system was envisioned as a way to free the farmer from "structural" constraints and enable him to increase his production and modernize methods of cultivation for both cash and food crops.

VII.E.3. Cooperative Evolution

The early cooperatives were in the classic Western tradition in that individuals joined by purchasing shares of stock. By 1965, there were perhaps thirty cooperatives and one hundred village mutual groups in existence. In 1966, the "new system" of cooperatives was established with the objective of expanding the movement and better adapting the cooperative to traditional structures. The "new system" was based on villages rather than individuals joining, with a village collectively deciding at a meeting whether to form a cooperative mutual group. There was to be no purchasing of shares (Volume II.G, p. 8).

The basic cooperative structure of Niger between 1966 and 1979 remained unchanged. The basic cooperative structure in Niger has been as follows:

- (1) The groupement mutualiste villageois (GMV) is the unit at the village level. This unit groups all members of the village into the basic cooperative structure.
- (2) The cooperative group consists of five to ten villages willing to collaborate and market their produce together. It chooses officers as well as demonstrators and extension farmers for training and its members offer their stocks as security for loans.
- (3) The associations locales de cooperatives (ALC) are formed in those regions where the market is sufficiently large to allow a cooperative union. Each ALC is composed of five to ten cooperatives and they have been prevalent in the peanut producing zone.

After the new system of cooperatives was introduced, rapid expansion of the cooperative movement occurred from 1966 to 1968. In 1968 there were 177 cooperatives and 1,888 GMV. The majority of cooperatives were in the major cash crop zones. From 1969 to 1974, the pace of cooperative formation slowed, owing to the limits of UNCC resources as well as the drought.

Rapid increases in cooperative development between 1974 to 1978 were largely the consequence of a government policy to extend the coverage of cooperatives to

areas of cereals production as well as the cash crop zones. These groups are not all uniformly active. Marketing remains the principal activity of cooperative groups, and in some cases, the only activity. The goal of multi-functional cooperatives has not truly been attained. Geographic distribution of cooperatives continues to be uneven. The Departments of Maradi and Zinder, historically covering much of the cash crop zones, continue to have the largest number of cooperatives.

The program of UNCC reaches a considerable number of rural population through the cooperative system. The population in the GMVs represents 59 percent of Niger's agricultural producers.

An important event in recent cooperative history in Niger was the enactment of the legal statute and cooperative laws and decrees in October 1978 and its subsequent ratification in January 1979. These decrees give the cooperatives legal status and lay the foundation for the eventual self-management of the cooperatives by their members (Volume II.G, p. 10).

The decree prohibits more than:

- (a) one Groupement Mutualiste (GM) to a village of less than 100 producers;
- (b) one cooperative per canton or nomad group;
- (c) one local cooperative union per arrondissement;
- (d) one department cooperative union per Département, and
- (e) one national cooperative union in Niger.

Thus cooperative self-management is encouraged by statute, and outside interference in cooperative affairs is prohibited. Each cooperative formulates its own rules, organizes general and special committees, and elects its officers and delegates to the next higher cooperative.

V^I.E.4. Purchases of Agricultural Products

It is difficult to discern trends in cooperative/UNCC purchases of farmers' agricultural products. Performance in groundnut and cotton marketing has been erratic due to the inconsistency of production of these crops. Cash crop purchases in actual volume have also been affected by a general decline in production of groundnuts and cotton. UNCC has increased its purchases of cowpeas from about

forty percent in 1972 to 75 percent in 1975 and almost the entire marketed production of cowpeas from 1976 to 1978 was through the cooperative system (Volume II.F, p. 83). Since 1970-1971, UNCC has also purchased cereals. UNCC mechanisms for cereals purchases performed well in 1976 and 1977, but its cereals purchases as a percentage of national marketed production declined sharply in 1978. Although the GON's future plans call for an increased share of primary purchases to be conducted through cooperative mechanisms, in the 1978 and 1979 seasons the GON relied heavily upon village chiefs for cereals purchases.

VII.E.5. UNCC Role as Input Supplier

UNCC's transportation and storage infrastructures are important in the GON's effort to increase food production in Niger. UNCC's capacity to distribute production inputs became more important when, in 1978, the GON created within UNCC the Centrale d'Approvisionnement* to coordinate the distribution of agricultural inputs that were originally distributed by several governmental agencies. However, Centrale lacks an administrative structure and lacks sufficient warehouse and transportation capacity of its own to distribute inputs (Volume II.G, p. 13). Given the volume and dollar amount of inputs that would be required to meet GON food self-sufficiency goals (Volume II.B), it is doubtful that Centrale will have adequate management capacity for several years. At the moment, delivery of inputs is being partially assured by the various Productivity Projects. It appears they will be required to continue to play this role for several more years.

Private transportation services account for twenty to forty percent of UNCC transport. At the Departmental and Arrondissement levels, local officials often use all available transport to deliver inputs to the Arrondissement and village levels. Although this has been adequate in the past, increased tonnage of inputs, particularly fertilizer, could easily strain the present system causing disruptions in supply lines in future.

*Provision center

VII.E.6. Farm Input Subsidy Policy

Information on subsidization of agricultural inputs over the past two decades is not readily available. Information on subsidies for fertilizer is available but fertilizer has only been used in increasing quantities in the last few years.

GON subsidies for major agricultural inputs were proposed under both the 1961-1963 and the 1965-1968 plans. FED was to provide a major part of these subsidies, particularly for fertilizer and animal traction equipment, but the Plan Quadriennal scheduled a "degressive" or tapered subsidy, decreasing in the case of animal traction equipment from fifty percent in 1965 to 25 percent in 1968. Unfortunately, no information appears to be available on actual results of the implementation of these policies (Volume II.G, p. 17). Generally, however, the tendency has been for subsidies to rise rather than fall. This occurs because government maintains constant sales prices for equipment while cost to government rises.

Since the Plan Quadriennal, information available on subsidies is limited to subsidies for fertilizer. It appears that from 1969 to 1971 fertilizer was not directly subsidized, but since farmer prices were identical with CIF cost in Niamey, the GON was apparently subsidizing all distribution costs. From 1972 to 1976, fertilizer was again directly subsidized. Differing types of fertilizer were subsidized at varying rates and subsidies for the same class of fertilizer also varied.

Figures show an increase in the level of fertilizer subsidies after 1974. These estimates of subsidies are, moreover, based on a comparison of CIF cost (Niamey) with farmer prices; the real rate of subsidization was therefore considerably higher when transportation to the farmer is included. The World Bank estimates subsidy levels for fertilizer in 1973 as ranging from 35 to 65 percent,* including delivery costs. Information on fertilizer subsidies in 1978 indicated a range of 28 percent to 58 percent, exclusive of internal transportation costs.

*Data also from Niamey Department Development Project 1980. At the same time fertilizer costing 120 FCFA on a CIF Niamey basis was being sold to farmers for 30-35 FCFA or over seventy percent subsidized.

For 1979, extensive information on the price structure of different types of inputs (except for seed) was available from UNCC. The overall level of subsidies for inputs envisioned by UNCC is about 400 million FCFA, or 57.2 percent of the cost of inputs to be purchased, after delivery to farmers. The rates of subsidization are high, ranging for individual items from 48 percent to 81 percent of costs, with subsidy rates highest for animal traction equipment. Spare parts for this equipment are apparently sold at cost price (Volume II.G, p. 19).

A major problem in supplying inputs is the procedural arrangements governing procurement and imports. UNCC must determine farmer demands for inputs and submit the estimates to the MDR* for approval. This in turn is approved by the Council of Ministers, which also sets the level of subsidies. Only after these approvals are obtained can orders be placed. The time delays between taking orders and actual delivery of supplies exceeds one year (Volume II.G, p. 14), thus supplies often cannot be delivered to farmers when they are needed (Volume II.G, pp. 16-17). Productivity increases expected by farmers may suffer due to these delays and repayment of loans may decline. In some cases, supplies of inputs fall far short of farmer demands thus making the true rate of technology absorption impossible to discern.

VII.E.7. The Five Year Plan

The perspectives for the development strategy of cooperatives in the five-year plan (1979-1983) are as follows:

- (1) Expansion of more cooperative structures in the rural areas;
- (2) Diversification of cooperative activities in order to orient time to multi-purpose organizations; and
- (3) Promotion of the self-management of the cooperatives where elected officers and cooperative members will be in charge of their own affairs and participate in all activities of rural development.

The three areas of emphasis are described as follows:

*Ministry of Rural Development

Cooperative Expansion. The five year plan is to have cooperatives organized in all agricultural and livestock development centers. Prior to 1974, cooperatives were organized in the industrial crop areas for peanuts, cotton, and rice. Under the 1976-1978 plan, cooperative organizations were extended to the cereal producing areas. At present, sixty percent of the total rural area of Niger has cooperatives. This expansion was aided by the Niger Cereals Project and the various Productivity Projects. Over the 1979-1983 Plan period two specific expansion procedures will be:

- (1) to develop cooperatives in the livestock sectors, and
- (2) regroup all cooperatives in an arrondissement (county) into a local union, with local unions forming a regional union at the Department level (state) and these latter unions forming a national union at the national level.

Diversification of Cooperative Activities. Cooperatives are to become more multi-purpose where members can satisfy their social and material needs. The main activities will be:

- (1) Marketing Activities. Farmers will be allowed to handle their own activities with less interference from the government officials.
- (2) Improvement of Agricultural Production. In the future, the cooperative organizations will be able to handle the supply and distribution of farm inputs to farmers.
- (3) Collective Saving and Utilization of Savings Funds for Development Purposes. The collective savings funds of the cooperative members will facilitate investment in various activities such as:
 - (a) Training programs for members;
 - (b) Constitution of reserves of agricultural stocks at the cooperative level;
 - (c) Planning and development of infrastructure such as warehouses or village drugstores, so that villagers will have the opportunity to participate in the village community program; and
 - (d) Supplying credit for social obligations of members.

Cooperative Self-Management. Fuller participation will be encouraged among cooperative members to promote expression of members' ideas, suggestions for improvements, and business management.

UNCC recognizes the need to provide the Centrale d'Approvisionnement with the necessary physical means to accomplish its mission. A list of projects submitted by UNCC for the Plan includes a project to establish an office complex, and storage and transport facilities for the Centrale. However, it is not clear if GON policy will permit the establishment of a flexible and autonomous management structure that will be a prerequisite of an adequate supply system. At present the volume of inputs has been kept down by the GON subsidy policy. With subsidies maintained at high percentages of unit costs but with total subsidy funds restricted, input use has been limited by a supply constraint rather than by lack of demand. As long as this persists, the UNCC Centrale will only function as a procurement office.

VII.F. La Caisse Nationale de Credit Agricole (CNCA)

La Caisse Nationale de Credit Agricole (CNCA) was created in 1967 as a separate institution under the jurisdiction of the Minister of Finance.

CNCA's goal is to carry out financial operations in rural areas, particularly through credit operations, to encourage agricultural, grazing, craft and fishing production. CNCA makes available short, medium, and long term loans to public and private individuals or groups involved in activities in the rural sector.

CNCA was created to place agricultural credit on a more sound financial basis. CNCA is governed by a Conseil d'Administration, which is the same council that governs UNCC.

The CNCA makes two basic kinds of loans: (1) short and medium term production loans; and (2) marketing loans to SONARA, OPVN, cooperatives and UNCC to enable these institutions to purchase agricultural products at harvest time. Advances for marketing have historically constituted one-half to two thirds of CNCA lending (Volume II.G, CNCA, p. 2).

Production loans to farmers are made in the form of inputs; cash loans are not made. UNCC organizes the cooperatives and GMV's to apply for loans. The application must be approved at the arrondissement and department levels before it can be submitted to CNCA. If the loan is approved, CNCA issues a loan certificate, and UNCC then supplies the inputs called for in the certificate. The cooperative is required

to place the equivalent of ten percent of the loan in CNCA as a guarantee fund of the cooperative's loan and the individual loans of the cooperative members. Agricultural products must be marketed through cooperative channels if CNCA production loans were utilized for crop cultivation. At marketing time, UNCC collects cash to repay the loan to CNCA. CNCA has pursued a policy of refusing loans to cooperatives in arrears, except when default is the consequence of natural disasters. CNCA does not forgive loans, but the due dates are delayed (Volume II.G, CNCA, p. 3).

Since CNCA will lend only to farmers for production purposes and to the cooperative system, loan diversion is precluded. All other credit needs of farmers must be obtained from the private sector.

The factors which limit the amount of credit extended to farmers by CNCA are, first, the amount of subsidies for inputs obtained from the government and, second, the capacity of UNCC to handle the logistics of procurement, storage and timely delivery of inputs.

CNCA has no share capital; its permanent resources are government grants of equity and deposits by the government and corporations. In 1974, CNCA's equity was raised by the government from 170 million FCFA to 370 million FCFA. In 1975 it received Treasury deposits to the value of 400 million FCFA. Deposits by the government and semi-public corporations had also reached a record high. These actions reversed earlier government policy of withdrawal of deposits from the CNCA, that had nearly brought the CNCA to bankruptcy. Its total resources grew from 734 million FCFA in 1972 to 2.7 billion FCFA in 1978.

Production loans in the late 1960's were only sixteen to seventeen percent of the total CNCA loans. However, in 1969-1970, production loans were 63 percent of the total loans. In 1974-1975, marketing loans comprised 67 percent of total CNCA lending. Over fifty percent of total credits in 1976 and 1977 represented advances for marketing. In 1977, it appeared from the CNCA annual report that farmer production loans represented 57 percent of its loan activity, while in 1978 it was forty percent. The loans for marketing involve low risk and have a rapid turnover.

CNCA ratio of bad debt to total loans or to total assets has improved since 1970. In 1971 and 1972, the bad debts were 38.9 percent and 20.5 percent respectively of total loans minus the "bad loans." This percentage has declined

steadily: 1973, 11.1 percent; 1974, 8.5 percent; 1975, 4.7 percent; 1976, 5.2 percent; 1977, 2.6 percent; and 1978, 2.9 percent. This decline represents increased loan activity rather than reduction in the absolute value of bad debts. With larger capital assets, CNCA has been able to increase its loan activity. However, the amount of bad debts has remained relatively stable over the last few years instead of decreasing. Bad debts were 48.4 million FCFA in 1972, 70.7 million FCFA in 1976, dropped to 42.9 million FCFA in 1977, but again exceeded 70 million FCFA at 71.4 million FCFA in 1978. CNCA carries doubtful loans in hopes of collecting them (Volume II.G, CNCA, pp. 4-5), rather than writing them off. Total loan volume rose from 1,950 million FCFA in 1976 to 4,500 million FCFA in 1977.

After independence, the first government plan, the Plan Intérimaire 1961-1963, recommended that cooperative structures should provide modern inputs to farmers on credit. The agricultural investment budget provided also for a rolling fund and subsidies to finance purchases of selected seeds, fertilizer, fungicides and agricultural equipment, and their sale on credit.

The Programme Triennial for 1976-1978 called for decentralization of CNCA processes for reviewing small loan requests and for accepting loan payments. This decentralization plan was designed to improve the accessibility of agricultural credit to the peasants. The CNCA was to give priority to meeting peasants' needs and it was to increase the orientation of credit towards the rural economy.

Caisse Nationale de Credit Agricole. The CNCA role of providing credit will continue under the Plan Quinquennal 1979-83 and requirements for credit should increase. In tentative programs released on the development of rainfed agriculture during the Five-Year Plan, the preliminary investment plans call for over 60 billion FCFA to modernize rainfed agriculture. If inputs for crop production are to be supplied in greater quantities to farmers and if more cereals and cash crops are grown and marketed through cooperatives, CNCA credit will need to be expanded for farmers and cooperatives, and for UNCC purchases of crops from the cooperatives.

VIII. MARKETING AND PRICING POLICIES

VIII.A. Cereals

VIII.A.1. Current Five-Year Plan, 1979-1983

In the case of cereals, GON policy is to guarantee a minimum price to producers that is to take into consideration the need for just remuneration to the producer as well as the cost of living to the consumer. OPVN will continue to fix both official and consumer cereal prices, to maintain security stocks and to distribute grain, particularly to deficit areas.

The current plan notes that the double nature of the marketing of agricultural products through public and private channels makes pricing and security stock activities very uncertain. Thus it appears that OPVN must confine itself to the role of a regulatory agency. The problem of purchasing cereals whether through public or private mechanisms and distribution to the final consumer must be solved. OPVN, in spite of recent improvements cannot always be the only agency responsible for distributing grain to an ever growing market. Such a system would end up being far too cumbersome. In addition, the plan highlights the problems of poor geographic distribution of warehouses and the need for more regional specific actions.

The Plan acknowledges the on-going conflict between producer and consumer price policies; it does not resolve the problem of marketing channel confusion or the need for integration of the total cereals marketing system. It offers no guidance toward the development of, nor setting of objectives to arrive at a sound workable cereals pricing policy.

VIII.A.2. Marketing Policy

Policy-making is hindered by a lack of basic data that should be generated by on-going statistical collection including market volumes and prices and carryover stocks. Further, there is a need for micro-level studies of marketing performance, price behavior and producer security needs in the cereal market as well as a system to monitor market flows (Volume II.F, p. 42). Only limited studies exist on the

actual operations of the grain market or on farmer behavior relative to production and sales decisions, and price variations in different markets at different levels of the distribution chain have been treated only perfunctorily.

Given these problems it is not surprising that marketing policy in Niger over the last ten-year period has been poorly defined with uncertain and sometimes contradictory objectives. This probably also explains why the private sector has not been integrated into a comprehensive marketing policy (Volume II.F, p. 43).

VIII.A.3. Pricing Policy and Implications

It appears that past Government policy on cereals pricing has been consumer oriented. Price level determination has been largely a function of the desire to capture an adequate share of the cereals market to maintain OPVN stocks or flows. This policy is a political determination of the GON and we make no judgment on its appropriateness in this study. There are, however, some implications on the supply side of cereals marketing.

OPVN's budgeted operating costs would seem to justify the producer-consumer price margin established. However, when actual operating costs are calculated on the basis of quantity distributed, they are found to be in excess of the set marketing margin (Volume II.F, p. 44). OPVN's total cost per kilogram distributed compared to the expected differential in the open market system indicates that OPVN's costs follow the same pattern of movement. If OPVN's cost structure increased at the same rate as inflation for the crop years 1977 and 1978, the results should closely parallel the open market differential. When the return for risk acceptance is subtracted from the open market differential, actual operating costs of the open market system are lower than OPVN's operating costs.

Official consumer prices are set too low to cover producer costs plus marketing costs.* The indications are operating losses, apparent reluctance to raise consumer prices as costs increase, and the understatement of actual marketing costs in the construction of the official consumer price (Volume II.F, p. 45).

*This observation based on analysis done in November-December 1979 may no longer be valid as consumer prices were raised in late 1980 increasing the margin. Ed. note.

The effect of government price policy on cereal crop production has been essentially nil. A test of market prices, official price, and expected farm gate price as related to production and acreage revealed no significant relationships.

Government policy has not had an impact upon farm income. A consistent pricing policy which set prices under the open market, in combination with the fall in available supplies during the seventies, led to no real income advantage for the producer. The impact of policy upon consumer income is unknown.

There is a production constraint caused by the lack of technology for intensive farming, a fast growing population, a high urbanization rate, and limited productive land availability in a harsh climate. Rather than a pricing problem, the question of cereals production becomes one of maintaining and exceeding the self-sufficiency level so as to develop an adequate marketing system to feed the growing urban population (Volume II.F, pp. 46-47).

In the current situation, marketing and price policy by itself cannot affect production and, consequently, the cereal volume marketed. The development of more intensive agriculture is required to relieve the production constraint. This does not mean that cereals marketing should be overlooked. First and foremost is the need to solve the production constraint assisted by correct pricing policy. Once intensive agriculture begins to be adopted by the producer, then emphasis must be given to improving the marketing system so as to facilitate the flow of cereals through it.

As Niger's farmers continue the evolution from a production unit oriented to self-sufficiency to a more commercial production unit, the farming system will change. Transferring from one system to another means that the farmers will increasingly produce cereal for sale as well as for their current consumption and food reserve. Therefore, in addition to the required intensification in farming, the farmer must be economically motivated to participate in a more intensive system. Consequently, government pricing policy must establish, in connection with adaptive technology, a "market incentive price" or that price level which motivates the farmer to produce by using supplied technology and training.

In setting a market incentive price the following data areas are required to construct a price level:

- (1) Cost of current production (seed and labor);
- (2) Cost of technological package to increase production (additional labor, seed, fertilizer, and pesticide);
- (3) Opportunity cost of alternate labor uses (hiring out versus own production);
- (4) Opportunity cost of marginal labor uses (expansion versus intensification); and
- (5) Price value of different levels of security stocks at producer level (Volume II.F, pp. 48-49).

VIII.A.4. Cereals Reserve

The amount of stocks carried by OPVN considered as a cereal reserve amounted to 19,270 tons in May 1979. Estimates of reserve stock levels for October 1979 were given as approximately 33,000 tons.

No known policy on cereal reserves exists. This is a shortcoming in government food policy and needs to be seriously addressed in relation to the need to increase productivity in the cereals sector. Current estimated reserves amount to only about 2½ percent of national consumption or approximately 1½ weeks of national consumption. This level of reserves cannot truly be considered a buffer stock and, therefore, this aspect of food policy needs to be further defined (Volume II.F, p. 51).

VIII.A.5. Required Production Targets--Cereals

Given the need to address production of cereals, there is a definite lack of production targets. None of the reference material or GON preliminary planning papers seem to deal with the problem of setting goals. Other than the general objective of food self-sufficiency noted in the five year plan, specific production targets are unknown. Even within the overall objective no analysis was attempted of price relationships should supplies increase and self-sufficiency be reached. It is likely that complete self-sufficiency would not impact greatly on price and concomitantly on crop acreages and production due to the expected heavy demand from Nigeria.

Area and yields of millet and sorghum, based on past performance, were projected for this analysis to the year 2000 (Volume II.F, p. 52ff). The assumptions indicate no change in the current production system. Projected land-use growth is 1.5 percent for millet and 3.0 percent for sorghum for a combined growth of 1.6 percent, one-half of the previous growth pattern. The land-use pattern is based upon regional departmental plans and available micro-studies which indicate that land usage is higher than admitted by government authorities. Therefore, there must be a slowing down of rainfed land usage to reflect the fact that there is some unknown limit to land-use expansion. (See Volume I, Section II.A.1.)

Yields indicate a downward trend for millet. This reflects the fact that as additional land is placed under cultivation, it will most likely be land of marginal productivity. Also, the usage of land year after year without fallow, which under present practices of removing the total crop, will force yields downward. The yields for sorghum could not be definitively patterned because the crop is generally grown on a different soil structure than millet. Therefore, the projected yield was flattened over a period of time.

It is considered that given the available information, the projected land usage and yields are fairly optimistic. If the current situation goes unchanged, a deficit amounting to forty percent of production will develop by the year 2000.

Three yield tracks were plotted for millet and sorghum through year 2000 (Volume II.F, p. 99). The lower yield track represents no change in the current situation. The center yield track represents the growth pattern in the levels of yields required to maintain self-sufficiency given the level of consumption at 250 kilograms per capita and the optimistic assumption as to land usage growth. This amounts to an increase of yields in the magnitude of two percent per year. Finally, the upper yield track represents the level of yields required to achieve self-sufficiency and develop a minimal marketable surplus. Given estimates of future cereal requirements in countries bordering Niger, this upper track should be the target yield pattern. This would allow a marketable surplus which would be expected to be drawn off by bordering countries, therefore allowing the level of self-sufficiency in Niger to be maintained. Such a target level requires yield increases amounting to 3.1 percent annually (Volume II.F, p. 59).

VIII.B. Cash Crops

VIII.B.1. Marketing Policies

Marketing policies for cash crops are at best vague. There are no detailed policy guidelines specifying how cash crop markets are to be rationalized. No guidelines exist for either export or domestic marketing targets. The relationship between domestic markets and export markets and how these demands are to be met has been ignored. Marketing policy affecting cotton appears to have been entirely conceded to CFDT.

VIII.B.2. Pricing Policies

Pricing structures for cash crops, described by law, are set forth each year. The GON specifies the minimum producer price, marketing margins, and applicable tax. While in principle the producer prices should be specified before planting time, this has not been the case, with the exception of the 1978 crop year.

Producer prices are stated to be set by using the factors of past trends, forecasts of distribution costs, and projected world prices. However, cursory examination of price structure fails to provide any correlation between these factors and official producer price (Volume II.F, p. 89).

Examination of the official price schedule and expected farm-gate open market price for cowpeas reveals, as in cereals, GON pricing has followed rather than led open market prices. Land area devoted to cowpea production is not correlated with price movements. However, over this time period, there is a significant correlation between expected open market farm-gate price and production trends. This is indicative of constraints in the use of land area. The appearance of more intensive cultivation of cowpeas, thereby raising yield levels, is undoubtedly caused by the major price increases in cowpeas. For example, the SONARA cowpea pricing structure shows no relationship between export price and official producer price (Volume II.F, p. 93).

Comparison of producer price and world price of cotton (average price received) reveals not only a widening spread between producer prices and world prices, but that world prices increased at a rate $1\frac{1}{2}$ times greater than the rate of increase in producer prices. Again, the explicit policy of setting producer prices has been negated (Volume II.F, p. 93).

In the cotton pricing structure, the difference between marketing margins for export and domestic sales is extremely small. Domestic sales are quite naturally less than world price since there are windfall profits and losses between targeting prices CIF port and prices actually received for exported cotton fiber. This does not mean that there is a two-priced system as proposed by some references, since the CFDT does not control world prices. This does not amount to a policy of protection and subsidization of local industry, since any greater price than that covering costs would simply be a transfer payment in this case.

In principle, the GON has expressed the need for producer prices that are stable and provide incentives to the farmers of cash crops. However, the actual history of producer prices in Niger shows that the organization in charge of marketing and export of the major cash crops actually contributed to restraining producer prices as world market prices rose.

Marketing organizations export into a world market where supply and demand effectively set the price received. The GON has adopted a policy of selling cash crops to local industry at prices below world market level (Volume II.F, p. 91).

VIII.B.3. Results of Pricing Policies

Lack of production cost studies prevents evaluation of official fixed producer prices in relationship to changes in real producer income or their impact on production of cash crops. Only an estimation of supply curves can be derived. In the case of peanuts and cotton, marketers are faced with backward bending supply curves. The shape of these curves indicate serious production constraints that need to be rectified in conjunction with future policy actions (Volume II.F, p. 96).

The supply curve for cowpeas is basically standard. Open market operations are faced with an extremely steep supply curve while the supply curve for government purchasing lies at approximately a 45 degree slope.

The most dramatic result of pricing policy actions is the way in which the producer share of market value changed over time. In the case of peanuts, the producer share of value eroded steadily over time. The share of market value for various sectors for cowpeas shows the same decline in producers' share of value. For cotton the same fall in producers' share occurs, as in peanuts and cowpeas. Substantial

windfall profits were accrued in export cotton marketing. Of these, a portion has been contributed to CSPPN. CSPPN, Caisse pour Stabilisation des Prix des Produits du Niger, is a special fund intended to protect producer prices from sharp annual variations resulting from fluctuations of world prices. Resources are derived from contributions of various marketing organizations and from indirect taxes on exports.

In practice, CSPPN has not actually operated as a price stabilization fund, but as a reservoir for what was thought to be excess funds derived from SONARA's marketing effort. As a result, producer prices were not related to world prices and were restrained.

GON revenues from the marketing of cash crops include operating profits, export taxes, contributions to CSPPN, and windfall profits. The total over the thirteen-year time period is substantial (Volume II.F, p. 100).

VIII.B.4. The Five-Year Plan, 1979-1983

According to the five-year Plan, the market organization for cash crops in Niger will remain essentially the same, with a few minor policy changes. The plan expresses the desire that all purchases of produce will be made through the cooperative network, via UNCC, so as to insure that the producers receive an adequate price. Why this should assure producers an adequate price is unknown. Previous indications are that the government pricing policy has been a price follower. Government has also ignored its own policy of setting official prices on the basis of world prices, distribution costs, and past trends.

The Plan implies some reorganization of SONARA, but achievement of its goals seems illogical considering price stabilizing funds are not used and production constraints are not addressed.

As noted above, the pricing structure for peanuts destined to be exported as oil is to be a function of world price of peanuts, peanut oil, and peanut meal plus an add-on expense for marketing costs. Peanuts destined for local oil consumption are to be priced relative to the consumers' ability to buy.

The Plan will apparently give priority to Niger's cotton and peanut processing industries. The pricing policies currently being followed are considered by the GON to be quite adequate for cash crop producers. The GON, therefore, believes

that low prices will no longer be a hindrance to increased cash crops production.

There is little given in the Plan concerning directions for marketing and pricing policy of cash crops. No target goals are constructed nor is the question of productivity constraint elimination resolved.

IX. ISSUES AFFECTING THE RURAL SECTOR

IX.A. The implications of Monetary Pressure in Rural Areas

The intense monetary pressure combined with increasing demand for farmland appears to be having major social and political ramifications in the rural areas. Monetization of the economy is not necessarily a negative process and in fact, this would be the normal result of developing and modernizing an economy. Nevertheless, the occurrence of a highly utilized money economy at the village level has some vital implications for Government policy.

If the need for money at the village level is extremely acute, attempting to recuperate money for rural capital formation or production investment could be difficult. On the other hand, if it can be demonstrated that an investment has high potential to produce cash money, the investment will appear attractive to the villager, easing technology diffusion. The key will be the magnitude of the return from the investment. It appears that cereals production technology has failed because of insufficient investment returns.

The question of income disparities in the rural areas is critical for GON policy makers. It does seem important to assess whether present policies are aiding or checking these disparities. If policy is to assist those persons who suffer most from monetary pressure, some interventions could be considered.

For example, the sale of millet at harvest by those least able to spare it could be addressed. Village cereals banks in Upper Volta, for example, have alleviated the pressure, maintained village grain stocks and assisted the poorest of farmers.

Farm-gate prices for agricultural products could be established before the planting season begins so farmers could better make management decisions and judge cash flows. These should be sufficiently high to set a floor price that is reasonable in relationship to parallel markets. This would then give those villagers that are forced to sell at harvest an alternative market, providing that market is in operation whenever farmers have a need to sell agricultural products.

Encouraging the build-up of national carryover stocks, both on-farm and government, will help to level out the present cyclical nature of the market. The vast fluctuations now existing only increase the financial disparities in the village.

The single "technical package" approach of the extension service and promotion of animal traction probably encourage the creation of income disparity. The extension services should approach the farmers, both men and women, as individuals with different resource holdings, cash flows or monetary constraints, and different labor availability, rather than as a homogenous group where every member is considered the average. It is quite likely that many individuals cannot participate in government encouraged programs.

The monetary pressure can only encourage the rural exodus. In addition to the morass of problems that could be created through the development of a greater urban population with few skills and little opportunity for employment, agricultural production could fall unless labor constraints are overcome or productivity vastly increases.

IX.B. Manpower

Analysis indicates that skilled manpower levels are already inadequate for on-going investments in the rural sector. Present training institutions cannot hope to meet needs for several years. Foreign technical assistance can alleviate some of the strain in the short run, but we do not see this as a very satisfactory solution. Given the language problems and lack of cultural and social understanding, as well as the high cost, providing the quantities of personnel needed from foreign sources can hardly be expected. To assure that on-going and planned rural development projects will achieve expected results, manpower requirements must be seriously addressed. In-country training facilities need to be expanded for lower level personnel. Overseas institutions should be utilized for mid-level people. Higher level training must be vastly expanded.

Even greatly increased training facilities or foreign scholarships cannot completely overcome manpower shortages, especially in the short run. Therefore, it will also be necessary to explore development methods that are far less demanding

of skilled personnel. Consideration should be given to turning over some present functions of the government to the private sector so that government can concentrate personnel in areas which are solely its domain and for which it is the most qualified to perform.

IX.C. Transportation Systems

Niger is unfortunate in being both land-locked and large in area relative to its natural resources. Thus both external and internal transport loom as major constraints to its development goals. These have not been analyzed in depth in this study, but their importance merits comment.

IX.C.1. External

Niger's main links to the outside world are three: (1) rail-dirt road connection to Abidjan, (2) rail-paved road to Cotonou, and (3) rail-paved road to Lagos (and Port Harcourt). Traffic has been increasing over all these routes. The degree to which it can continue to increase will be a major determinant in Niger's investment projects' achievement and in the ability of the GON to supply production inputs to Niger's farmers. Given that imports should increase tremendously to meet planned development in the mining sector, the transport system could be seriously strained. Thus, it is conceivable that delivering inputs for agricultural production could suffer.

IX.C.2. Internal

Niger's internal transport system has improved tremendously in the past fifteen years. Paved roads now link almost every major city. However, secondary and tertiary routes are still inadequate. This transport system needs serious study in the face of increasing inputs for production and the need to move larger quantities of food from surplus areas to urban centers and deficit areas.

IX.D. Agricultural Statistics

To undertake the planning for specific interventions under the overall agricultural strategy for Niger requires a good statistical data base for the rural sector. At present this base does not exist. Data is lacking in both quantity and quality on key elements of the agricultural production and economic systems. It is to be expected that statistical data would not be as thorough as one would like, given the cost and time required for its collection. However, some elements are essential to adequate planning, research and performance evaluation and attempts to improve this base should be addressed.

Official data series on the resources employed in agriculture should be more systematically collected. Although some of this data is presently collected, much of it is of questionable validity. In addition, the data should be presented on smaller geographic zones such as cantons.

Cross section data is sorely lacking. Very little information is available on family budgets or individual savings, investment and consumption patterns. Labor utilization studies should be initiated across several regions of the country.

Data should be systematically collected on effects of government interventions in agricultural production. What information is presently available is of doubtful quality. One problem appears to be that data on results of agricultural extension programs is collected by the extension agents. In addition to being inadequately trained to collect this data, they often appear to see it in their interest to overstate the results of their own work.

Price series for agricultural products, inputs and rural consumer items should be collected in markets throughout the agricultural zone. Present data does not permit testing of the assumptions that are being made on marketing systems, marketing margins or inflation rates.

In general, it appears that most data are only estimates that have been made without much statistical rigor. Planners have used this data to design project interventions and have then evaluated the results with further estimates. Unless some method is introduced to test the validity of these estimates and to establish adjustment factors for them, false readings on investment projects may result. The true situation may not be known and the stimulation of production in the rural sector may not occur.

IX.E. Forestry and Conservation

The natural vegetation in Niger has been declining in recent years due to the increase in population and the effects of drought. Serious conservation problems are now occurring with increased frequency. Wind and water erosion are not the only results of a decreasing vegetative cover. Soil fertility is declining, and availability of forest products is less assured.

Conservation and reforestation needs must be emphasized. Several factors should be seriously addressed, such as:

- (1) A review of existing forestry codes from the villager's viewpoint to determine if the codes have a negative effect on re-establishment of tree stands.
- (2) Assessment of other social or economic incentives that may promote villager participation in conservation.
- (3) Improvement of the productivity of existing crop lands to reduce the expansion of cultivated areas and the denuding of forested areas.
- (4) Efforts should be made to produce animal fodder so that natural grazing, especially in the southern zones, can be reduced.

IX.F. Research Priorities

IX.F.1. Agronomic Research

A major research effort must be continued for the improvement of cereals production. Although a great deal of progress has been made in cereals production research, it is far from adequate. Although INRAN appears to be aware of most of the areas of research requirements, the following major points should be stressed (Volume II.B and C):

- (1) Cereals varieties, particularly millet, need development. The present varieties offer little encouragement for drastic yield improvements. Varieties need to be developed that meet the needs of specific climatic zones.
- (2) Crop rotations with legumes, such as cowpeas and intercropping cereals with legumes, deserves more stress. Given the cost and logistics of importing nitrogen, the search for nitrogen fixing legumes should be emphasized.

- (3) Soil fertility maintenance at a satisfactory level for crop production is probably the number one soil management problem in Niger. Soil management research should encompass all aspects of fertility maintenance, including organic fertilizers, chemical fertilizers, bush or managed fallow, and plantation with Gao trees, to name a few.
- (4) Due to the sandy nature of Niger's soils, increased emphasis should be placed on researching water retention improvement. Surface contour plowing and cultivation, small terraces, pre-rain cultivation, and improving soil water-holding capacities should be stressed.
- (5) The economics of technical packages, crop rotations, fertility management, and crop diversification, appears to have been understressed.
- (6) Research in animal traction is sorely lacking in Niger. With the exception of one study undertaken in 1965, we found no information relating to the areas that could be cultivated by animals, types of equipment to use and force required to pull them. No one has looked at feed and upkeep requirements for oxen or donkeys, no information was found on which type and size of farm and fields were the most efficient for animal traction. In no case had anyone looked at the economics of animal traction, actual yield changes or the sociological implications of owning working animals. Given the GON stress on integrating animals in the farming system through animal traction in Phase II, this seems surprising.
- (7) Pesticide use has expanded tremendously in recent years in Niger. The implications of pesticide use must now get attention in research. At present, Canada and Germany are providing some assistance in this area. That effort probably needs expansion.

The above are only some of the points that need emphasis in Niger's agricultural research efforts. Strengthening research efforts will require improved communications and cooperation both within Niger and with outside research institutes and between donor groups. It will also require better long term statements of objectives and longer term commitment by assistance agencies.

Finally, the strength of research in Niger will ultimately depend upon expanding its pool of scientists. Much more high level training is needed.

IX.F.2. Socio-Economic Research

At present the amount of economic research is very low. A few micro-studies by social scientists have been conducted, but these are heavily biased toward the Maradi and Zinder Departments. Further, the studies are incomplete. Additional research should provide:

- (1) Family labor studies which include the total labor utilization (agriculture, para-agriculture, other);
- (2) The degree of wage labor;
- (3) Labor migration, internal and external; incidence and time of migration, motivation for migration and savings from migration;
- (4) Level of capital investment in the rural sector;
- (5) Consumption and savings functions in the rural sector, and by age and income groups;
- (6) The extent of commercial land transactions;
- (7) Patterns of land holdings and changes in those patterns;
- (8) Farming systems, including production costs, access to inputs, farm management decision-making and cash flows;
- (9) The reasons for acceptance or rejection of extension programs;
- (10) Access to markets, services, transport facilities and spatial geography of the rural sector; and
- (11) The effects of risk aversion in the management decision-making process.

Many of the above studies would permit more accurate project designs. They would also serve as checks on statistical series and permit corrective or adjustment factors to be used on official data. Obviously more emphasis needs to be placed on the Western Departments where few studies have been done.

IX.G. Uranium

Uranium has given Niger a degree of economic independence that the nation was never able to attain through the exports of cash crops and livestock. Government

of Niger revenues from uranium production have been rising steadily, and by 1990 should represent about fifty percent of total revenues. In that same year foreign exchange earnings from uranium exports could attain 225 million dollars (Volume II.A)

While the importance of uranium to Niger's economy cannot be overstated, some notes of caution are in order.

- (1) The projections for budget outlays in the capital and current accounts rely heavily on uranium and foreign aid to obtain the planned growth rates. These growth rates in turn generate the non-uranium revenues needed to maintain the planned targets. The key factors are the capacity of uranium- and foreign aid-financed investments to expand the economic base sufficiently to generate those revenues, i.e., the rates of return must be substantial.
- (2) Considering (1) above, it is essential that the economic base create a self-sustaining economy in the event that production of and/or income from uranium declines.
- (3) On the demand side, it should not be difficult to project usage given the long investment period to bring nuclear energy plants on stream. Thus, reasonable projections can be made, with the only questions being availability of petroleum and ability to switch to other energy sources such as coal.
- (4) The supply side is more difficult to predict both in terms of quantity and price. The uranium supplier cartel that evidently inflated the price of uranium over the past decade may not maintain adequate solidarity to determine price. At the same time, development of new deposits around the world is uncertain.
- (5) The projections of productions was based on estimates of plans. Although it appears that the Japanese have decided to proceed with development of their Afasto deposits, the exploitation of American-French deposits at Imourarez (the largest deposit) appears to be delayed due to disputes between the principals.* What this will mean for production targets is uncertain.
- (6) Projected revenues were based on current prices for uranium and current production costs. Given extremely high rates of inflation around the world and uncertain costs for petroleum, production costs could rise. If uranium prices do not rise the same as

*See African Business, February 1980.

inputs, profits in the mining sector could fall, which would lead to lower GON revenues.

Generally, it appears that uranium can generate the revenues the GON requires to meet investment in the current Plan. Overall revenues should cover current capital costs, meet GON counterpart funding and cover recurrent costs through 1980. It will be important to monitor actual revenues and expenditures over this period. It will also be important that these investments generate planned growth in the rural sector if food needs are to be met. If they do not, revenues will have to be diverted into food imports.

IX.H. Implications of Present Agricultural Extension Efforts

The most glaring criticism of the agricultural extension services is that they have not been able to mount a consistent program that has gained the trust and respect of the farmers. It appears that the productivity projects have made some progress in overcoming that attitude. However, until a serious effort is launched to determine exactly what does and what does not work in the techniques of extension, or in the technology being promoted, we do not envision any great progress.

Because millions of dollars in investment ride on the effectiveness of the extension services, their methods must be more systematically planned, executed and evaluated; because of the social and cultural implications of extension work, the planning should be most correctly left to the Nigeriens. However, it is clear that since Niger does not presently have adequate manpower to meet these requisites, manpower development is of primary importance.

Finally, it appears that, at least for some areas of the country, a serious shortcoming of rural extension programs is the exclusion of women from the target group. It will not be possible for Niger to modernize ninety percent of its farmers in the next two decades if this group, which in some cases provides up to thirty percent of crop production as well as a significant percentage of processing and marketing of crops, is ignored.

IX.I. Seed Policy

A major effort in seed production has been launched through the National Cereals Project. However, a policy governing the production and quality control of seed has yet to be developed. Even if new varieties are developed by research, it seems highly unlikely that seed purity and varietal integrity can be guaranteed under existing systems.

IX.J. Agricultural Inputs

IX.J.1. Financial

The medium term strategy for increasing agricultural production will place a heavy burden upon the financial resources of UNCC and CNCA. CNCA as furnisher of credit to both farmers and UNCC bears the greatest part of this burden.

Demand for inputs could reach a total of over fifty million dollars per annum by 1990. Depending on world market prices and GON subsidy policies, GON subsidy requirements could reach an annual cost of over \$25 million.

The cash flow situation of the CNCA is equally as important as the total volume of inputs. If payment for imported inputs must be made six to eight months before expected delivery and the Bank must carry farmer on credit through the growing season, then funds could be tied up for over twelve months. This would require the Bank to have liquid balances in excess of 1.5 times annual input requirements.

It appears that a full financial analysis would be required of CNCA and UNCC operations, to determine if these increasing financial obligations will become a restriction on expanding agricultural production. This analysis should include determining general financial ratios and tests as well as sources and applications of funds. In addition, a more systematic accounting of loans, repayment rates and bad debts need to be introduced so that the true cost of loans can be ascertained.

IX.J.2. Physical

The provision center of UNCC will require expansion if it is to be the major source of agricultural inputs. This will require major improvement in procurement

systems, inventory controls, transport and storage of goods and general administration. A major plan should be designed to permit both GON and foreign donors to respond to the needs of a national input system.

IX.K. Subsidies

The subsidy policies of the GON are rapidly becoming a serious constraint to agricultural development. It appears that the GON has viewed subsidies as an aid to input utilization and therefore an arm of agricultural extension. However, as subsidized inputs are increasing in use, the reality is that subsidies are now becoming a major resource transfer from government to the rural sector. Unfortunately, GON resources have been inadequate to cover the total amount required if demand for inputs were to be met. Thus the subsidy policy has had the effect of a supply constraint.

A thorough review of current subsidy policy should be made. A clear statement of the goals of subsidies should be articulated and the GON should assess the financial requirements of a given policy.

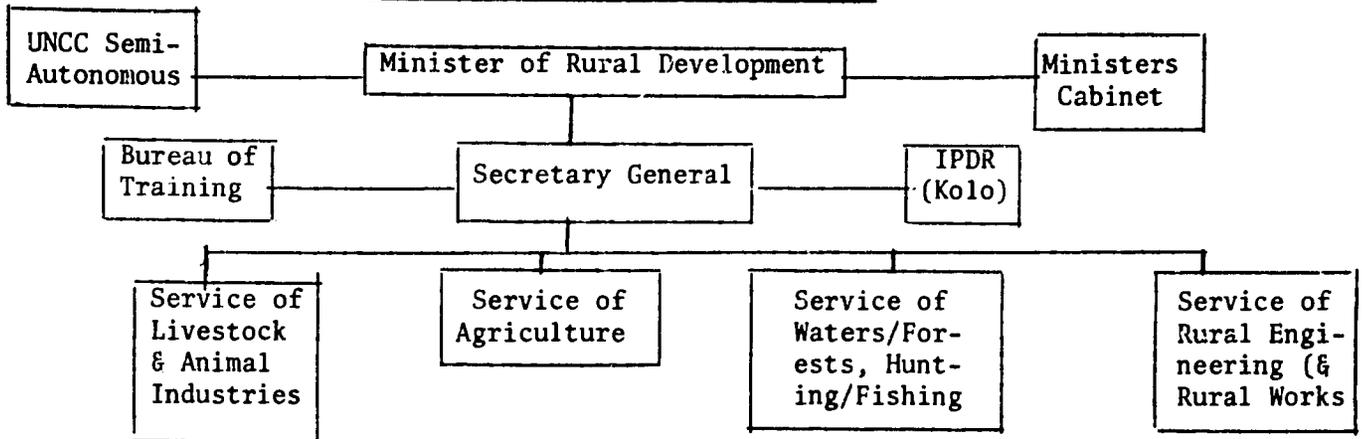
ANNEXES

**Annex I. COMPOSITION OF GOVERNMENT AND STRUCTURE OF
THE MINISTRY OF RURAL DEVELOPMENT AND
SERVICES IMPORTANT TO AGRICULTURE**

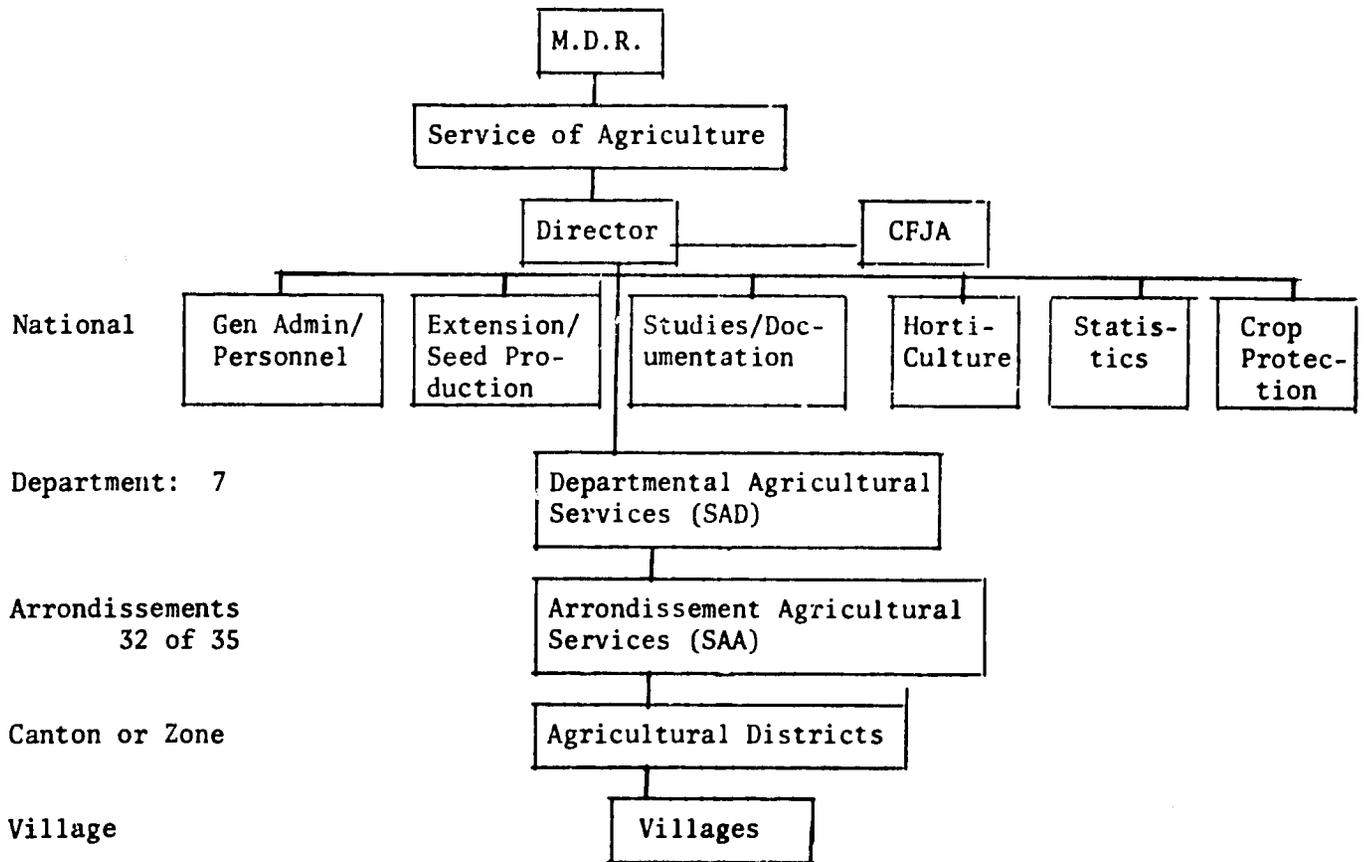
I. Composition of the Provisional Government.

1. President of the Supreme Military Council, Chief of State, President of the Council of Ministers, Minister of Defense
2. Minister of National Education
3. Minister of Information
4. Minister of Interior
5. Minister of Finance
6. Minister of Public Health and Social Affairs
7. Minister of Foreign Affairs and Cooperation
8. Minister of Rural Development
9. Minister of Public Service and Employment
10. Minister of Postal and Telecommunications
11. Minister of Plan
12. Minister of Mines
13. Minister of Hydraulics
14. Minister of Economic Affairs, Commerce and Industry
15. Minister of Youth, Sports and Culture
16. Minister of Justice
17. Minister of Public Works, Transport and Urbanism
18. Minister of Higher Education and Research
19. Secretary of State for Foreign Affairs and Cooperation
20. Secretary of State for Interior

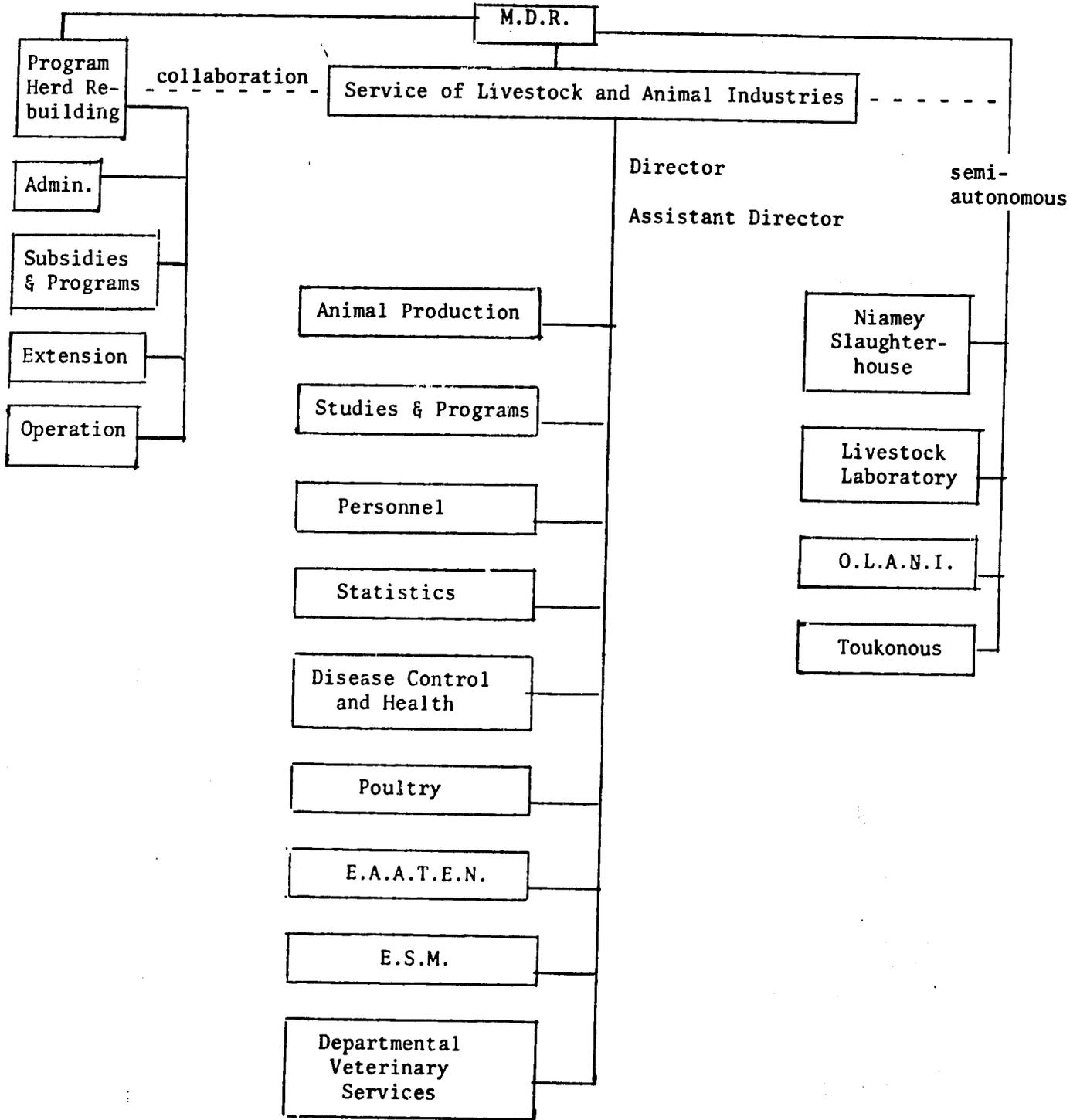
II. Ministry of Rural Development



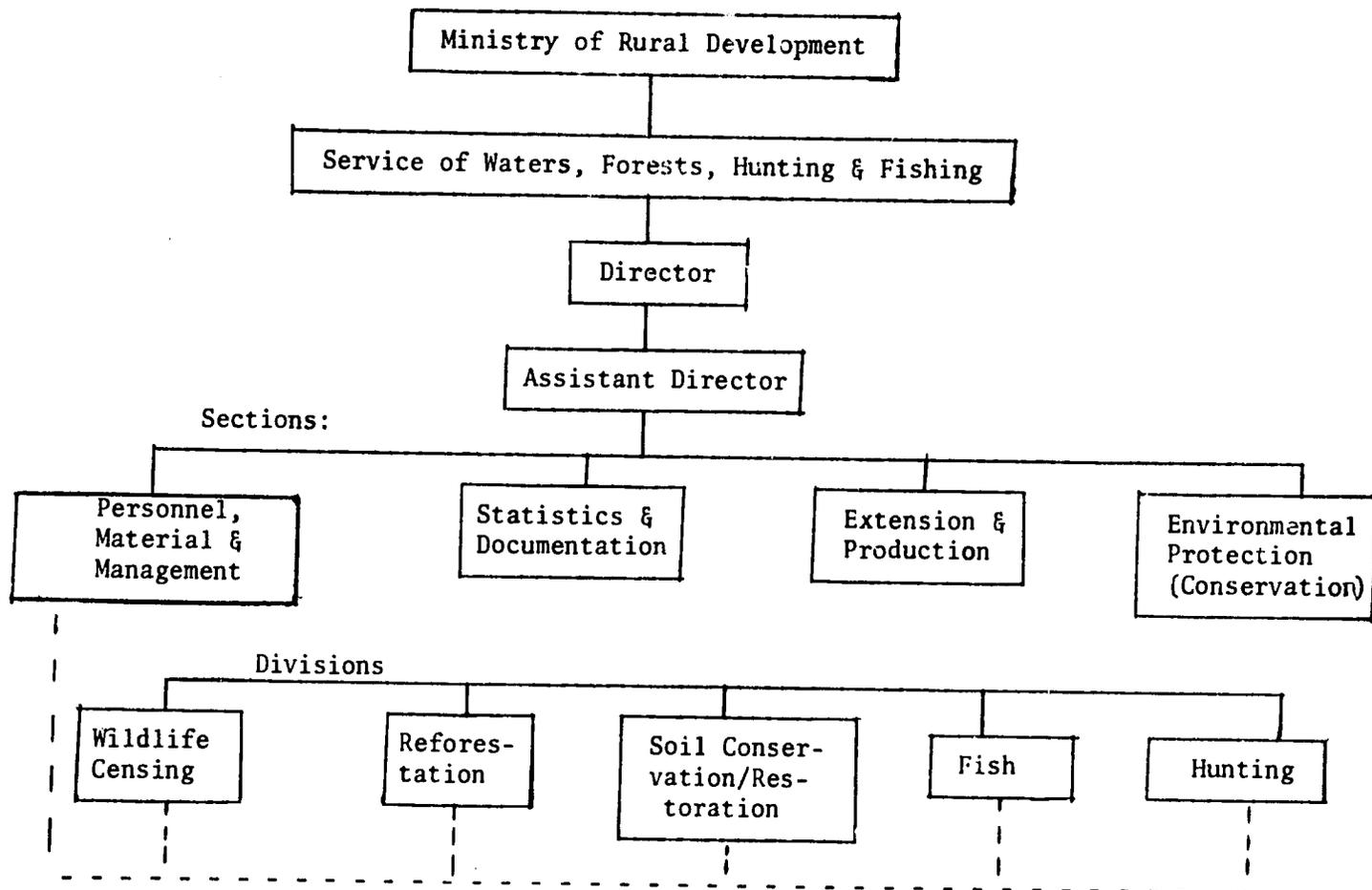
III. Agriculture



IV. Elevage

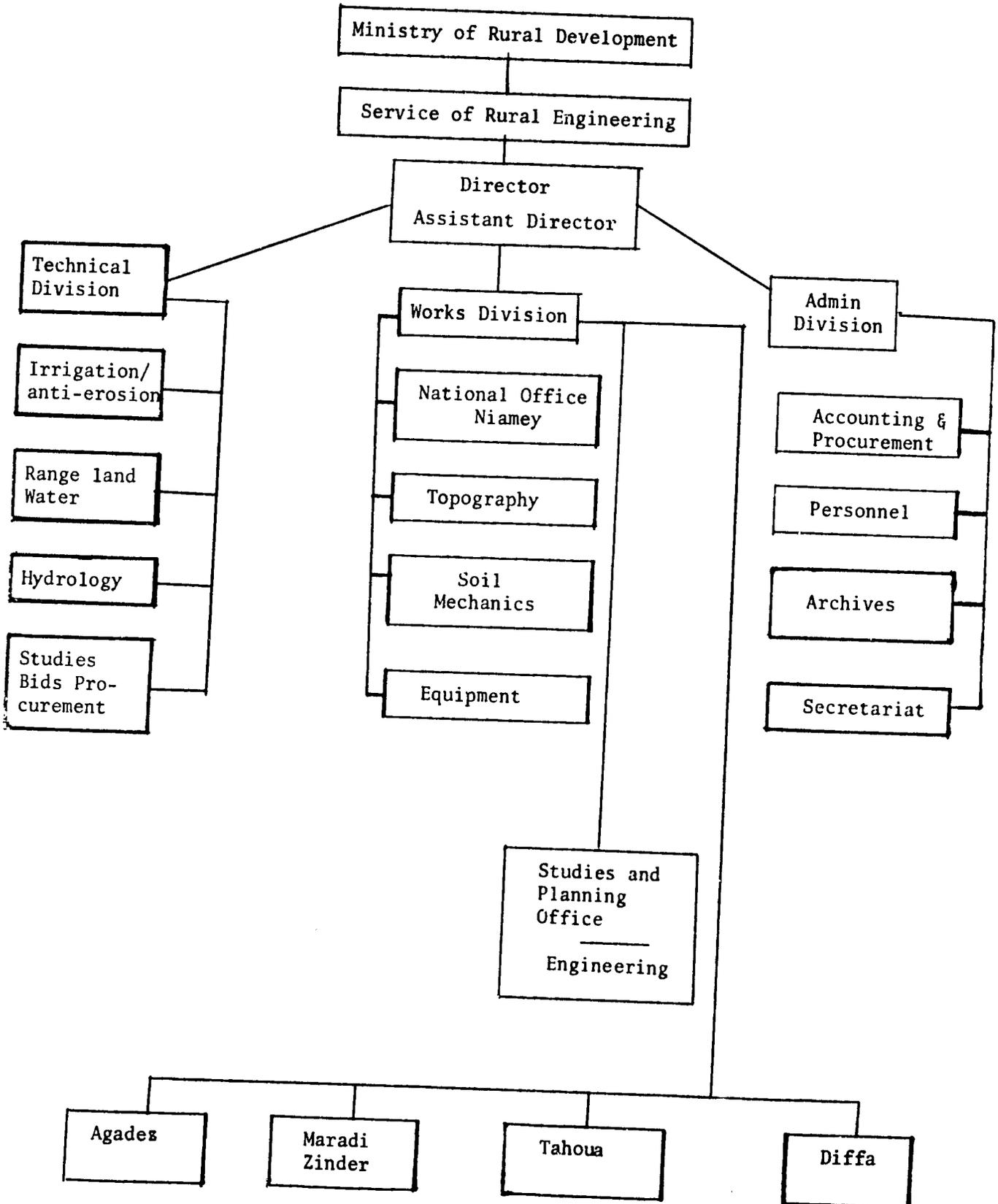


V. Waters and Forests

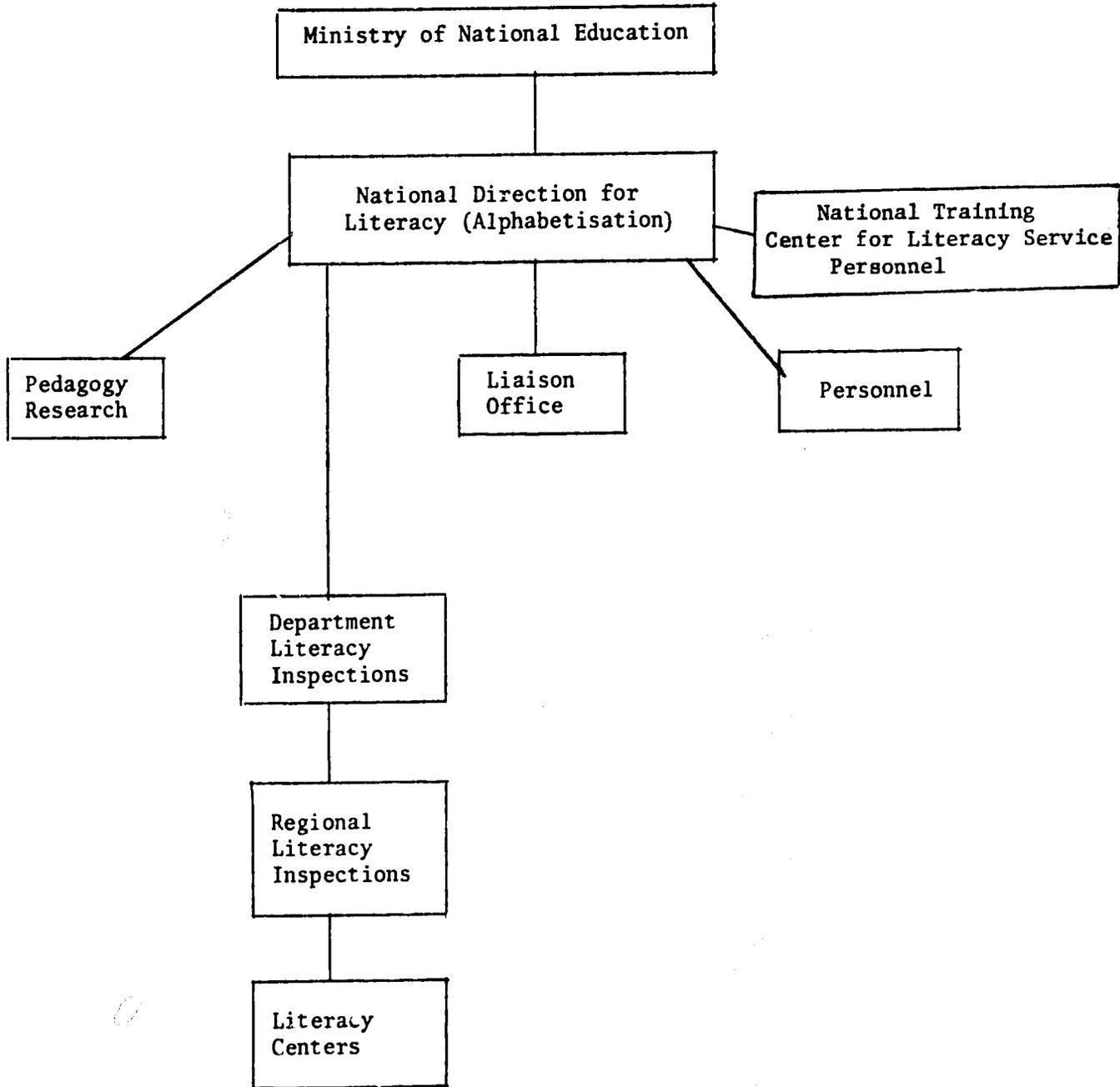


Department level	Departments	Arrondissement	Forestry Posts
	Niamey	6	5
	Dosso	5	3
	Tahoua	7	2
	Agades	3	2
	Maradi	6	0
	Zinder	5	3
	Diffa	3	1

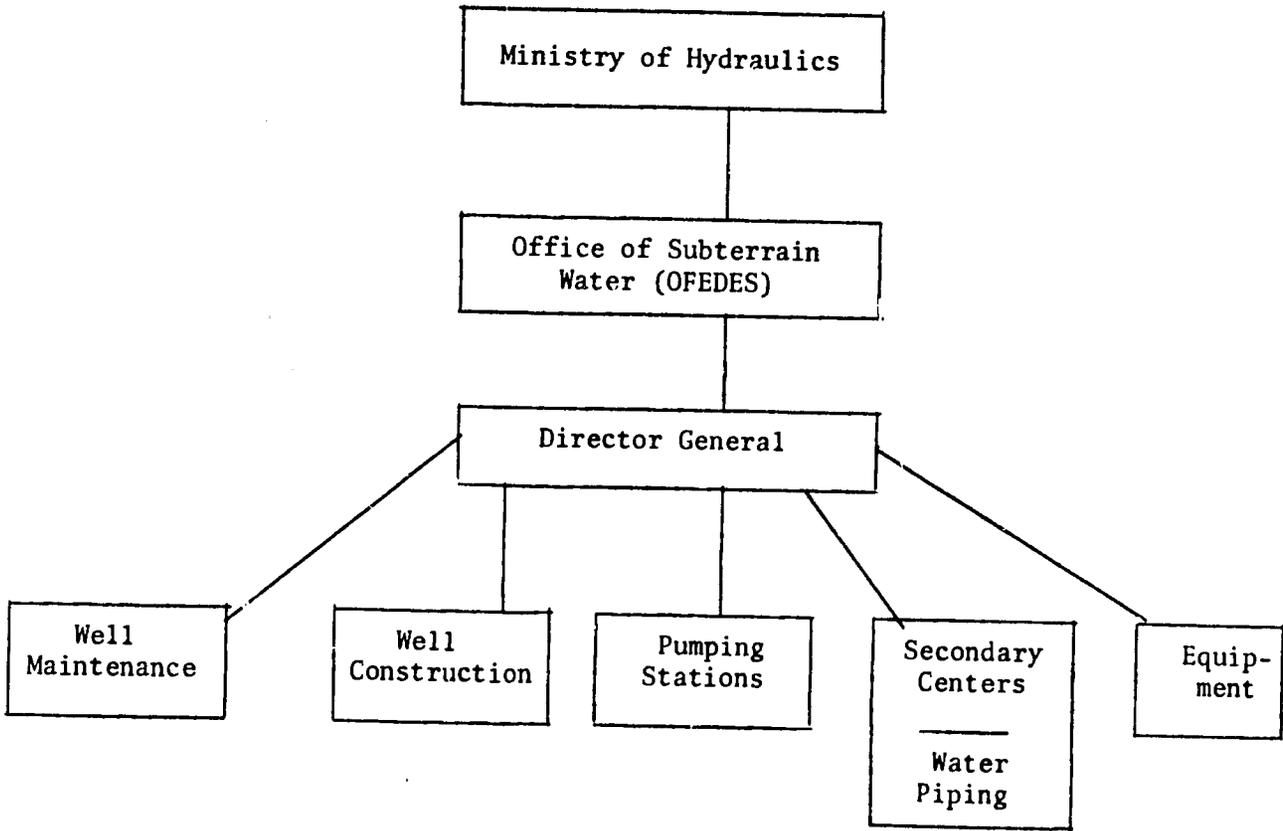
VI. Rural Engineering



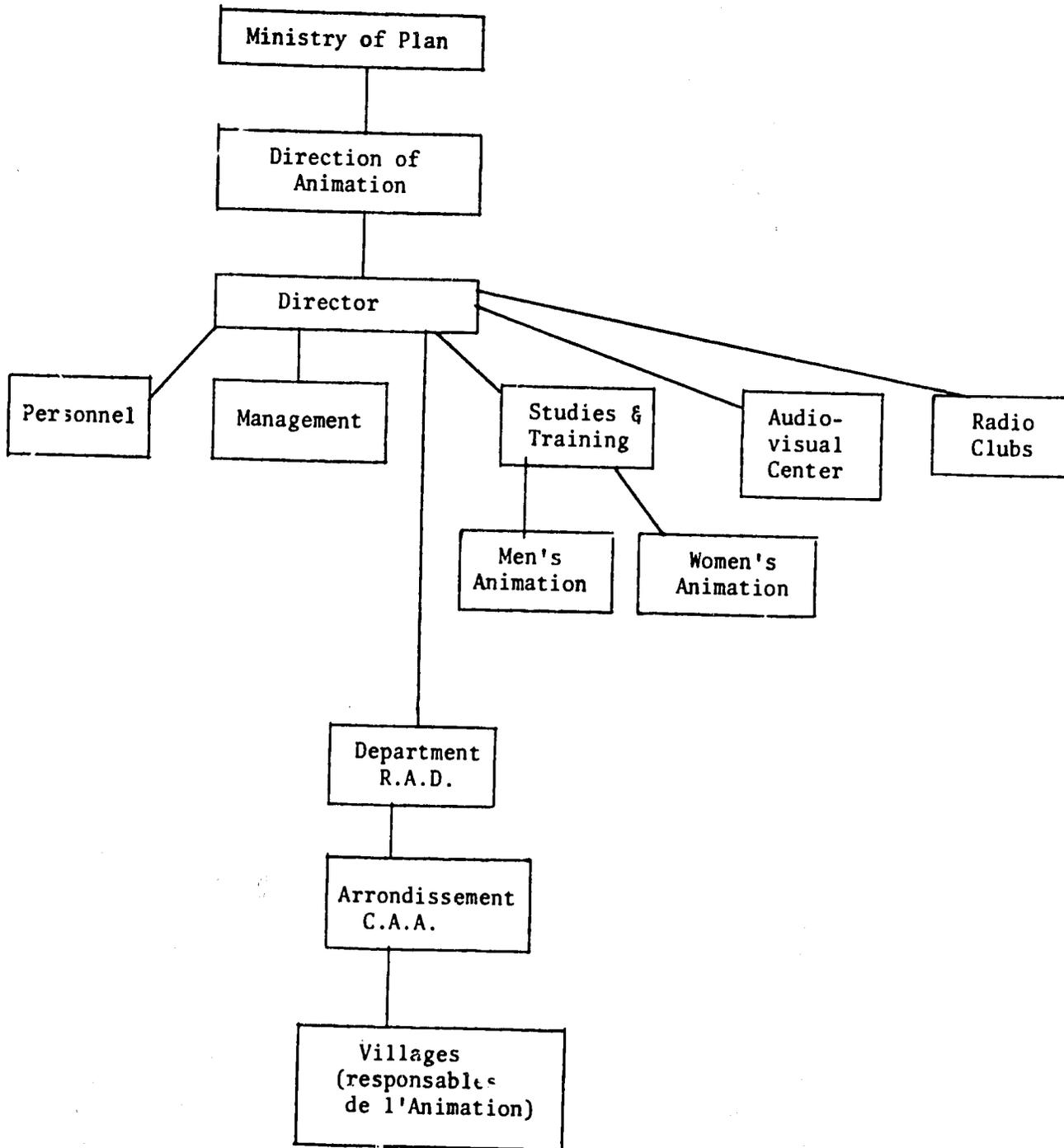
VII Adult Literacy



VIII. Rural Water



IX. Animation



Annex II. TRAINING INSTITUTIONS FOR
RURAL DEVELOPMENT

Training Centers for Medium and
Higher Level Technicians

1. University level--Agronomy & Animal Husbandry, University of Niamey
Ecole Supérieure d'Agronomie et d'Élevage de Niamey (ESA)
2. Institute for Practical Training for Rural Development
Institut Pratique de Développement Rural de Kolo (IPDR)
3. School for Assistants and Agents for Animal Husbandry & Veterinary Medicine
Ecole des Assistants et Agents techniques d'Élevage de Niamey (EAATE)
4. Center for Training and Application in Agrometeorology and Hydrology
*Centre de Formation et d'Application en Agrométéorologie/Hydrologie
Opérationnelle (AGRHYMET)*
5. School for Training Literacy Technicians
Ecole des Cadres d'Alphabétisation
6. National School of Administration
Ecole Nationale d'Administration (ENA)
7. National School of Public Health
Ecoles de la Santé Publique
8. E.S.M.
Ecole des Surveillants d'Élevage (hides and skins), Maradi

Annex III. DEFINITIONS/ABBREVIATIONS/ACRONYMS

ALC	Association Locale de Cooperatives (UNCC)
Animation	Community Development/Motivation - a direction under the Ministry of Plan
BRGM	Bureau de Recherches Geologiques et Minieres, Paris
Central d'Approvisionnement	Agricultural Input Supply Office (UNCC)
CFA	Monetary unit of West African countries (Niger, Senegal, Upper Volta, Ivory Coast, Benin, Togo). For this study, 200 CFA francs equal one U.S. dollar.
CFET	Compagnie Française du Développement des Textiles
CILSS	Comité Permanent Inter-Etats de Lutte Contre la Sécheresse dans le Sahel
COPPONIGER	Société Nigerienne de Commercialisation
CNC	Comité National des Céréales
CRED	Center for Research and Economic Development, University of Michigan
Crop Year	1 December to 30 November
DARMA	Division Artisanat Rural et Machinisme Agricole (UNCC)
Eaux et Forets	Waters and Forests - Service of the Ministry of Rural Development
Elevage	Livestock Production - Service of the Ministry of Rural Development
FNI	Fonds Nationale d'Investissement (Government of Niger)
Génie Rural (GR)	Rural Engineering (Public Works), Ministry of Rural Development
GON	Government of Niger
ICRISAT	International Institute of Tropical Agriculture, Ibadan, Nigeria
INEDES	Institut d'Etude du Développement Economique et Social, Upper Volta
INRAN	Institut National de Recherche Agronomique du Niger
IPD (PAID)	Pan African Institute for Development (Camerouns)
IRAM	Institut des Recherches et Applications des Methodes, Paris
MDR	Ministry of Rural Development, Niger
NITEX (SONITEXTILE)	Société Nigerienne des Textiles
OLANI	Office du Lait du Niger

ONAHA	Office Nationale des Aménagements Hydro-Agricoles (formerly part of OGAHA/UNCC and Génie Rural)
ONG (PVO)	Organisation Non-Governmental (Private Voluntary Organization)
OPVN	Office des Produits Viviers du Niger
ORSTOM	Organisation pour la Recherche Scientifique et Technique, Outre-Mer. (Paris)
REDSO	Regional Economic Development Service Office, USAID/Abidjan
Resource Humaines	A direction under the Ministry of Plan for planning foreign professional training
Riz Niger	Mixed company for rice processing
SEDES	Société d'Etudes pour le Développement Economique et Social
SEPANI	Société d'Exploitation des Produits d'Arachides du Niger
SHN	Société des Huileries du Niger
SICONIGER	Société Industrielle et Commerciale du Niger
SONARA	Société Nigerienne de Commercialisation de l'Arachide
SONERAN	Société Nigerienne d'Exploitation des Ressources Animales
SONIPRIM	Société Nigerienne de Primeurs
SNCP	Société Nigerienne de Collecte des Cuirs et Peaux
SOTRAMIL	Société des Transformation du Mil/Sorgho
ULC	Union Locale des Coopératives
UNCC	Union Nigerienne de Crédit et Coopération

Annex IV. BANKS AND DEVELOPMENT AGENCIES

ADB (BAD)	African Development Bank
BADEA	Arab Bank for Economic Development in Africa
BCEAO	Banque Centrale des Etats de l'Afrique du l'Ouest
BDRN	Banque de Développement de la République du Niger
BIRD (IBRD)	International Bank for Reconstruction and Development
CIDA (ACDI)	Canadian International Development Agency
CNCA	Caisse Nationale de Crédit Agricole
CSPPN	Caisse pour la Stabilisation des Prix des Produits du Niger
FAC	Fonds d'Aide et Coopération (France)
FED	Fonds European de Développement (European economic community aid agency)
RFA	République Fédérale Allemagne (West Germany)
United Nations:	
FAO	Food and Agricultural Organization
PAM (WFP)	Programme d'Alimentation Mondiale
PNUD (UNDP)	Programme des Nations-Unis du Développement
USAID	United States Agency for International Development
USDA	United States Department of Agriculture

Annex V. ABBREVIATIONS OF GOVERNMENT TECHNICAL PERSONNEL

A	Agrostologue: Range Management Specialist
AC	Administrateur Civil: Civil Administrator
AE	Adjoint Technique de l'Elevage/Assistant d'Elevage: Technical Assistant of Animal Husbandry
ATE	Agent Technique de l'Elevage: Technical Agent of Animal Husbandry
ATGR	Adjoint Technique du Génie Rurale: Technical Assistant of Rural Engineering
BAC	Baccalauréat: Equivalent of 13 years school
BEPC	Brevet Elémentaire Premier Cycle: Equivalent of Junior High School
C	Comptable: Accountant
CAP	Certificat d'Aptitude Professionnelle: Certificat of Professional Aptitude
CAg	Conseiller Agricole: Agricultural Advisor
CEF	Contrôleur Eaux et Forets: Forest Ranger
CF	Conseiller Forestier: Forestry Advisor
CGR	Conseiller des Travaux du Génie Rural: Rural Engineering Advisor
ChB	Chef de Bureau: Office Head
COM	Spécialiste en Commercialisation: Marketing Specialist
CSF	Contrôleur des Services Financiers: Comptroller
CTA	Conducteur des Travaux Agricoles: Assistant Agriculturalist
CTP	Conducteur des Travaux Publics: Assistant Civil Engineer
DC	Agent du Développement Communautaire: Community Development Officer
DVE	Docteur Vétérinaire d'Etat: Veterinarian (DVM)
E	Economiste: Economist
IA	Ingénieur d'Agriculture: BS Agriculture
IAE	Ingénieur Agro-Economiste: BS Agricultural Economics

IAM	Ingénieur Agro-Météorologue: BS Agro-Meteorology
IEF	Ingénieur des Eaux et Forêts: BS Forestry
IEM	Ingénieur Electro-mécanicien et Mécanicien: BS Mechanics and Electro-mechanics
IER	Ingénieur de l'Équipement Rural: BS Machinery
IF	Inspecteur Financier: Auditor
IGéo	Ingénieur Géomètre: BS Geometry
IGC	Ingénieur du Génie Civil: BS Civil Engineering
IGR	Ingénieur du Génie Rural: BS Rural Engineering
IG	Ingénieur Hydraulicien et Ingénieur Hydrogéologue: BS Hydraulics and Hydrology
IIA	Ingénieur des Industries Agricoles: BS Agri-business
IM	Infirmier, médecine humaine: Nurse in human health
IMA	Ingénieur du Machinisme Agricole: BS Agricultural Machines
ITA	Ingénieur des Techniques Agricoles: BS Technical Agriculture
ITE	Ingénieur des Techniques d'Élevage: BS Animal Husbandry
ITF	Ingénieur des Techniques Forestières: BS Forest Production
ITGéo	Ingénieur des Travaux de Géomètre: BS Geometry
ITM	Ingénieur des Travaux Mécaniques: BS Mechanics
ITop	Ingénieur Topographe: BS Surveyor
ITP	Ingénieur des Travaux Publics: BS Civil Engineering
ITR	Ingénieur des Travaux Ruraux: BS Rural Engineering
ITTP	Ingénieur des Travaux des Travaux Publics: Supervising Engineer
M	Médecin (docteur et licenciés en ser. inf. humains): Doctor
MCO	Cadres moyens des Coopératives: Mid-level Cooperative Specialist
P	Pédagogue: Teacher-Trainer
PhB	Pharmacie - Biologie - Microbiologie: Pharmacist - Biology - Microbiology
S	Sociologue: Sociologist

SD Secrétaire de Direction: Executive Secretary
St Ingénieur des Statistiques: BS Statistics
SCO Cadre Supérieurs des Coopératives: Upper-level Cooperative Specialist
TAM Technicien Agro-météorologue: Agro-Meteorologist Technician
TH Technicien en Hydrologie: Hydrologist Technician
TMA Technicien en Machinisme Agricole: Agro-Mechanic Technician
TS Technicien Supérieur: Advance degree (different activities)

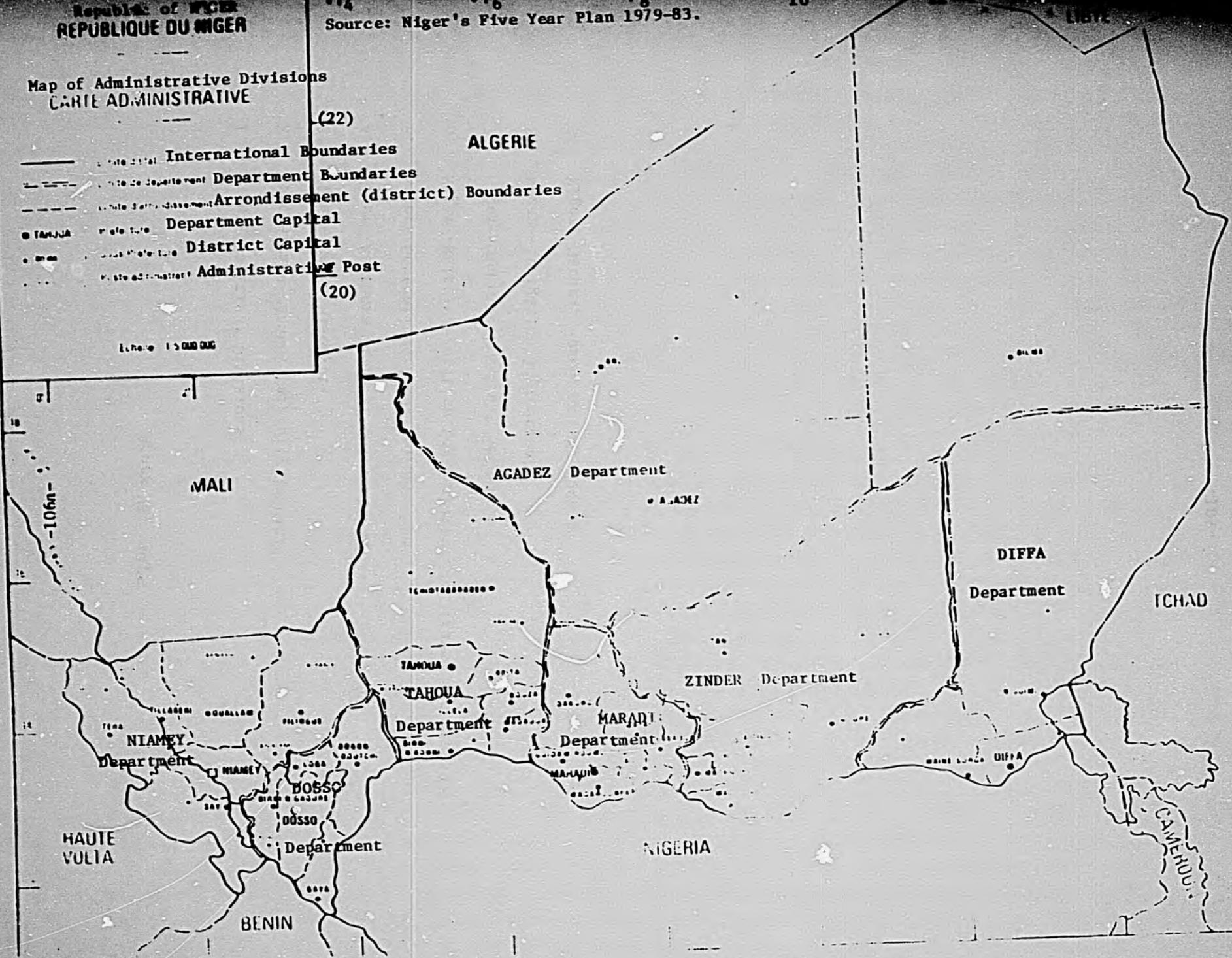
Annex VI. MAPS

1. Niger--Political Divisions
2. West Africa--Annual Rainfall, ISOHYETS
3. Niger--Map of Isohyets
4. Niger--Northern Limit of Cultivation
5. Niger--Generalized Areal Geologic Map
6. Niger--Relative Position for International Travel and Transport
7. Niger--Internal Transport Network
8. Niger- igation Improvements
9. Niger ural Resources, Production

Map of Administrative Divisions
CARTE ADMINISTRATIVE

- International Boundaries
- - - Department Boundaries
- - - Arrondissement (district) Boundaries
- NIAMEY Department Capital
- District Capital
- Administrative Post

Echelle 1:500,000



MALI

ALGERIE

AGADEZ Department

DIFFA Department

TCHAD

ZINDER Department

NIAMEY Department

TAHOVA Department

MARADI Department

HAUTE VOLTA

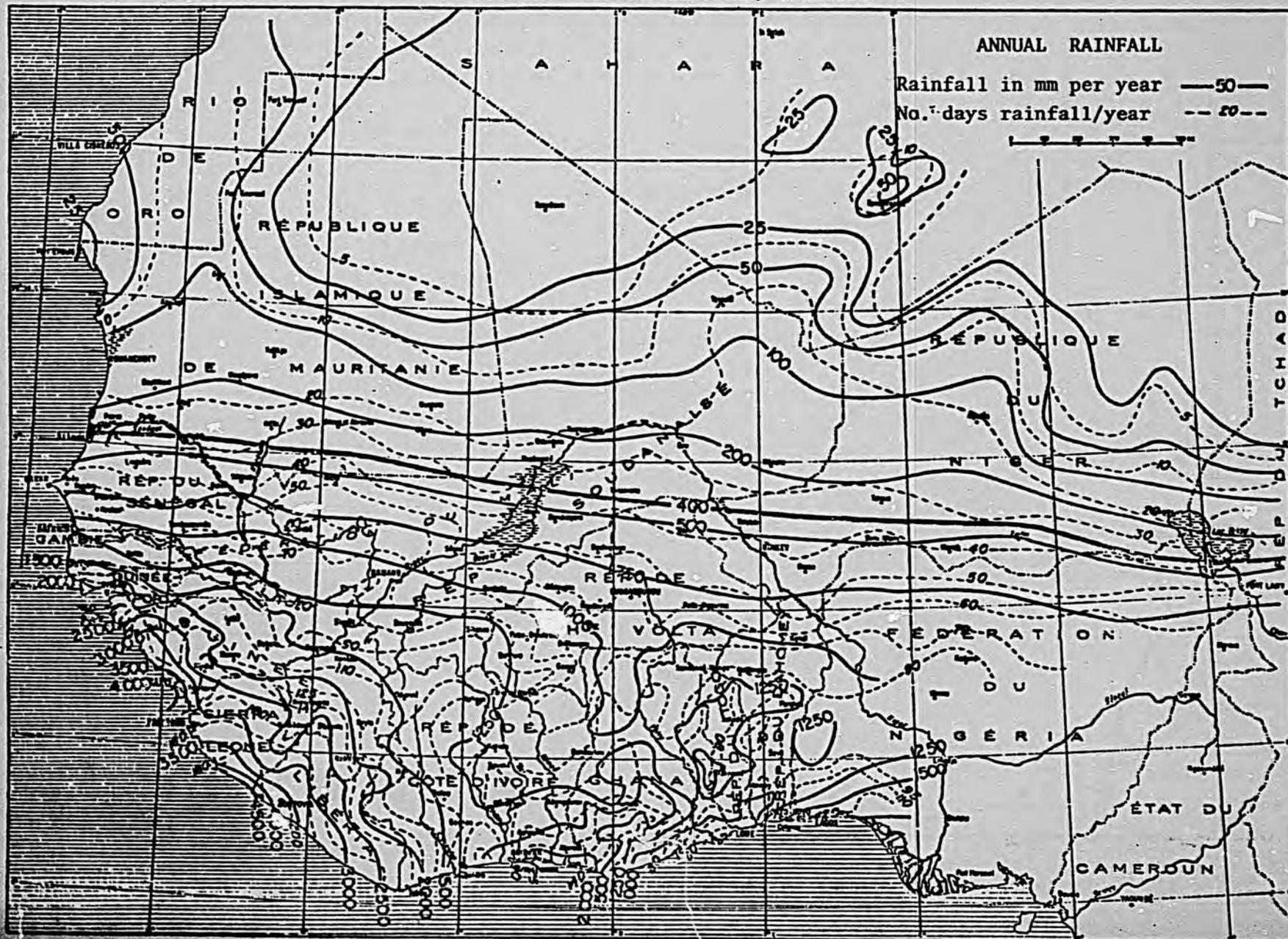
BOSSO Department

NIGERIA

BENIN

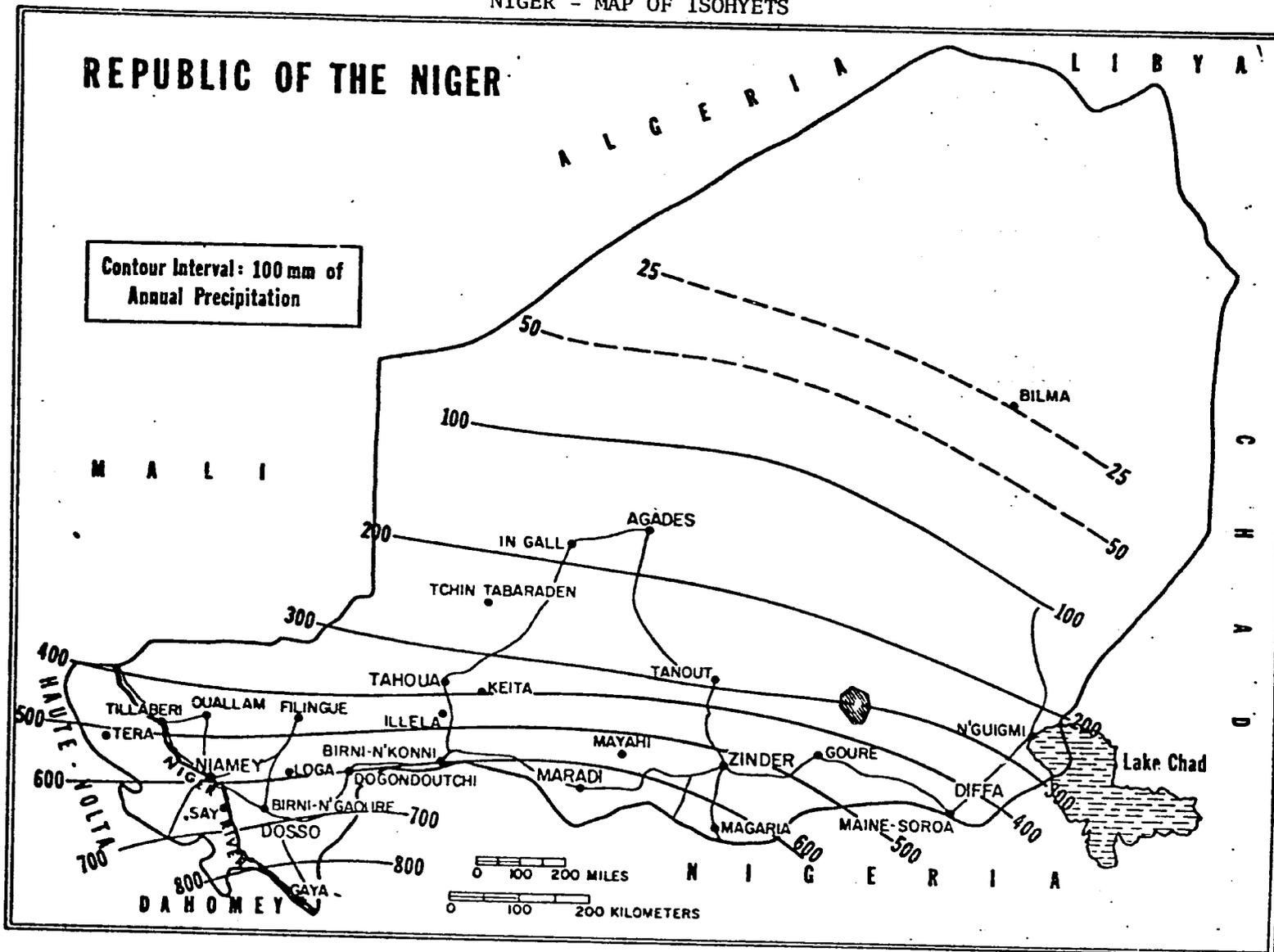
CAMEROON

WEST AFRICA - ANNUAL RAINFALL, ISOHYETS

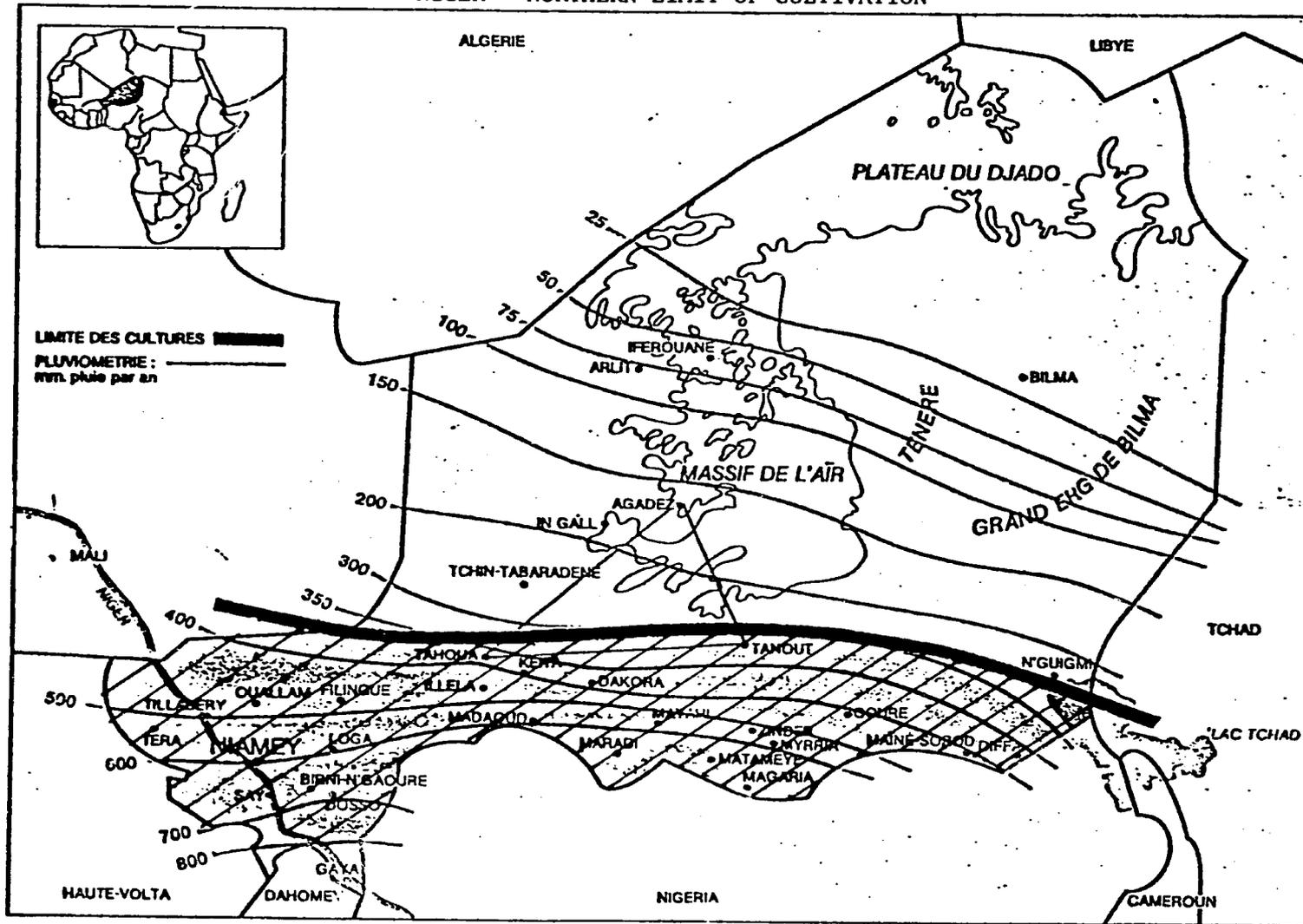


Source: Jean Archambault, Les Eaux Souterraines de L'Afrique Occidentale.
 Paris: Masson, 1960.
 Reproduced by permission of the author, Nancy, 1960

NIGER - MAP OF ISOHYETS



NIGER - NORTHERN LIMIT OF CULTIVATION



Approximate position of the Northern Limit of Cultivation (LNC) 

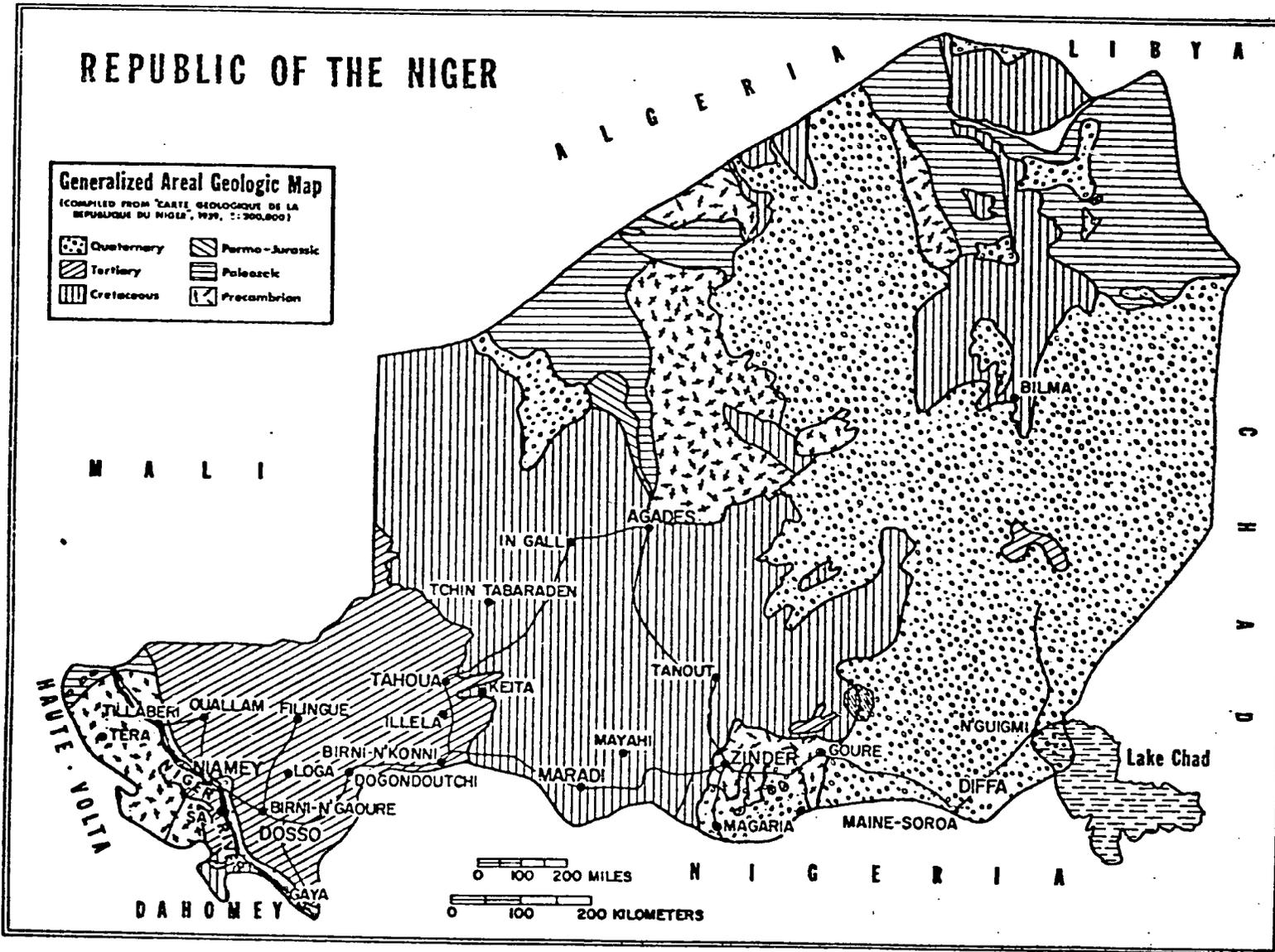
and agricultural zone 

REPUBLIC OF THE NIGER

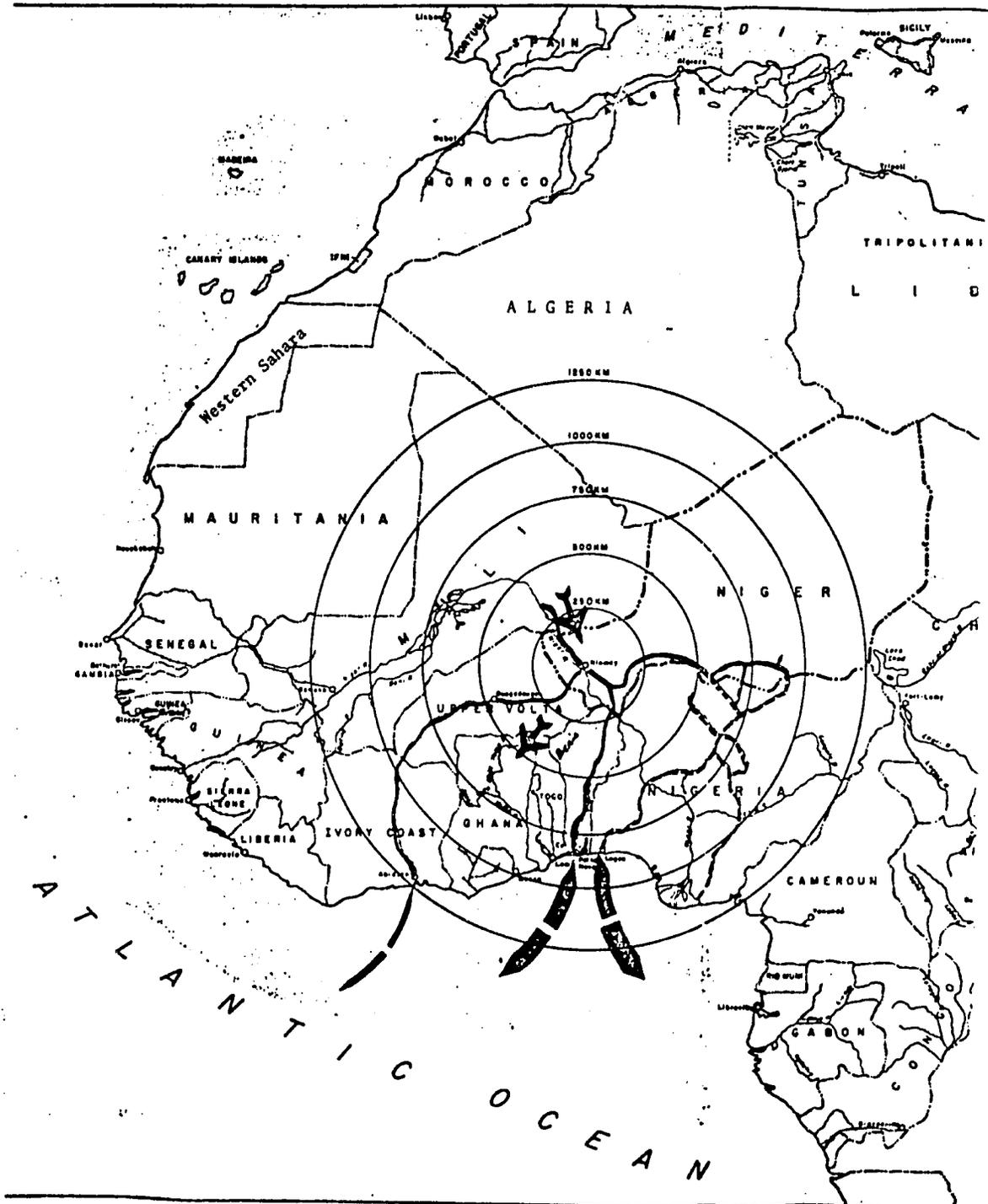
Generalized Areal Geologic Map

(COMPILED FROM "CARTE GEOLOGIQUE DE LA REPUBLIQUE DU NIGER", 1979, 1:300,000)

	Quaternary		Permo-Jurassic
	Tertiary		Paleozoic
	Cretaceous		Precambrian

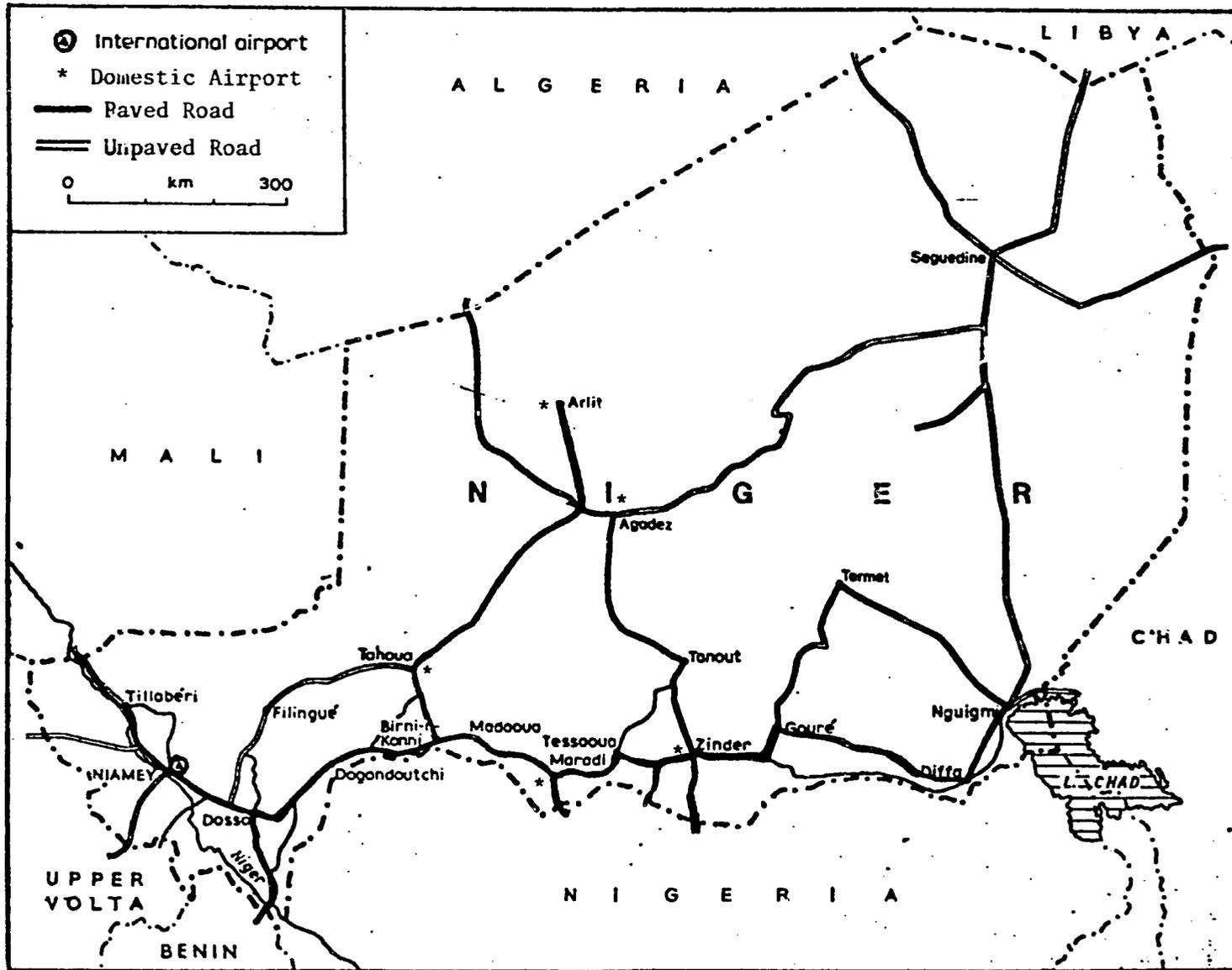


NIGER - RELATIVE POSITION FOR
INTERNATIONAL TRAVEL AND TRANSPORT
AND MAJOR IMPORT/EXPORT ROUTES



Source: E. Lionel Pavlo, Consulting Engineer, 530 Fifth Avenue, New York City NY

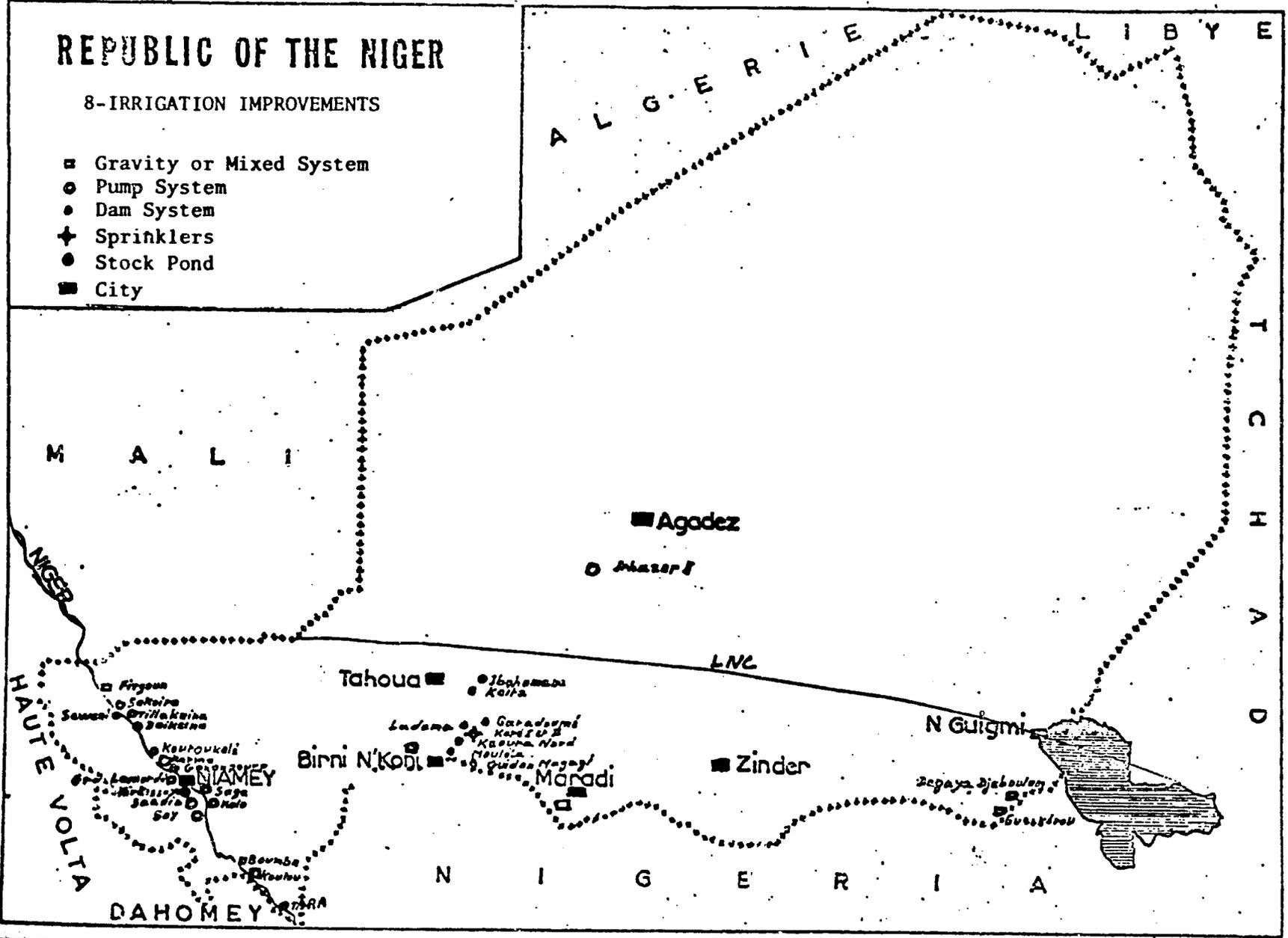
NIGER - INTERNAL TRANSPORT NETWORK



REPUBLIC OF THE NIGER

8-IRRIGATION IMPROVEMENTS

- Gravity or Mixed System
- Pump System
- Dam System
- ✦ Sprinklers
- Stock Pond
- City



TERMS OF GENERAL REFERENCE FOR THE NIGER AGRICULTURAL SECTOR ANALYSIS

The Niger Agricultural Sector Analysis is a review of public sector involvement in promoting agricultural growth. It is intended to be phased over approximately four months and will deal primarily with the rainfed agriculture sub-sector. In-depth surveys of the livestock and irrigated production sub-sectors will be treated at a later date. The rainfed sub-sector analysis will describe the evolution of government strategies, policies and institutional involvement in the agricultural sector and will describe planned public interventions as proposed in the forthcoming five year plan. After clearly describing the physical and social setting, past policies and development strategies, the Agricultural Sector Analysis team will attempt to determine changes which have occurred in the agricultural sector since independence as well as the relationship between such changes and the various policies for agricultural development which have been pursued by Niger. Such an analysis will provide an indication of the effectiveness of public intervention as a change agent in respect to Niger's rural population and agricultural production.

Against this background of past performance in promoting agricultural development, the team will examine the public sector infrastructure, institutional responsibilities for implementing these agricultural policies and will review policies and programs contained in the 1979-1983 plan. This analysis will provide an assessment of development objectives which can reasonably be expected during the forthcoming planning period. It should also point out areas where external assistance may be instrumental or necessary in order to achieve planned growth or development targets.

The third major part of the Niger Agricultural Sector Analysis is an assessment of whether past, present and future policies and strategies adequately address the constraints which the analysis team feel are the most crucial for the long-term development of Niger. This portion of the analysis will estimate the physical limits to growth of the Nigerien agricultural sector both in terms of socio-cultural factors and natural environmental constraints.

Throughout the analysis, particular attention will be given to describing the institutions and organizational arrangements for implementing various GON policies and strategies. One focal point of the analysis will be the technical package of improved production practices which is offered to farmers. The team will evaluate the package from the vantage point of their respective specialties and will assess the system for delivering this package as well as the likely impact of the package if accepted by farmers.

The result of the analysis will be a determination of areas where donor assistance would be effective in assisting the GON to meet its planned objectives. Specifically the analysis team and the USAID/Niger officials, in consultation with Nigerien officials, will prepare Project Identification Documents for projects which will continue the efforts begun under the Niger Cereals Project.

The Agricultural Sector Analysis is scheduled to begin mid-October and be completed before the end of the year. A team having the following specialties will be responsible for preparing the final document.

1. Rural Sociologist
2. Agricultural Extension Advisor/Agricultural Economist
3. Agronomist
4. Cooperative Specialist
5. Grain Marketing/Storage Specialist
6. Agricultural Research Administrator
7. Possibly a team leader and editor

In preparation for the team, the mission will be collecting certain documentation and data and preparing preliminary analysis for use by the team.

- A. Description of agricultural development policies, strategies and agricultural development institutions. Analysis of public investment in Agriculture under past plans and as proposed under the new five year plan.
- B. Collection of data on Agricultural production and marketing and analysis to determine major trends. Collection and preliminary analysis of micro-economic data for production units. (Household budgets, time use study, farm surveys).

- C. Demographic study, preliminary sociological survey with attention to the role of women in agricultural development.
- D. Analyses of the performance of the national economy with special consideration of the impact of increased earnings from uranium mining. This analysis is expected to start about mid-August. It will be summarized in the Agricultural Sector Analysis and will be used as preparatory information for the scheduled bilateral talks.

Whenever possible the analysis will cover from 1965 to the present. The agricultural development policies to be analyzed will be those contained in the 1965-69 plan, the four-year rolling plans from 1967 to 1974, the three-year drought recovery plan from 1976 to 1978, and finally, the five-year plan currently being written. The timeframe covered by the analysis has been extended in order to include data on several "normal" years prior to the drought.

TOR - AGRICULTURAL RESEARCH ADMINISTRATION

Objective: To determine priority areas of Agricultural Research in order to alleviate rainfed agricultural production constraints, and to assess the organization structure and capability of Niger's agricultural research organization and the relationships of this organization to the technical services responsible for applying research findings.

Description: Using available materials and documents consultant will review and summarize past agricultural research policies and programs of the Government of Niger. The analysis will include a description of the current organization conducting agricultural research (INRAN) and its physical and human resources. The consultant will examine relationships between the research organization and the technical services using such research. Specifically, the consultant will examine existing procedures for and interaction between the technical service and research institutions in determining research priorities, planning and managing research activities, assessing research findings, packaging research finding for use by the technical services and evaluating application of research findings.

The agricultural research administrator will summarize agricultural research priorities as contained in the five-year plan and the administrative and management structures planned to implement such a research program. With other members of the Agricultural Analysis Team, the consultant will evaluate the adequacy of proposed research programs and priorities.

The consultant will, in collaboration with other team members, USAID/Niger personnel and Nigerien officials, identify areas where AID's assistance may be beneficial to improve Niger's research capability or to facilitate translating research findings into extension programs for small farmers. The consultant will then assist in drafting Project Identification Documents (PID) for the continuation of research efforts commenced by the Niger Cereals Project.

Qualifications: The Agricultural Research Administrator must have advanced degree(s) in Agronomy and/or Soils Science, and experience in planning and administering scientific and applied research in Francophone Africa. The consultant must have analytical skills to review research policies, research management and administration, and institutional building efforts. The consultant must have French language capability of R-3/S-3 level.

TOR - GRAIN MARKETING/STORAGE SPECIALIST

Objective: To assist in determining the role of the public and semi-public marketing institutions in Niger and the impact of these institutions on Nigerien rainfed agricultural production.

Description: Using available documents, literature and materials pertaining to the marketing and storage of the major agricultural crops in Niger (millet, sorghum, cowpeas, peanuts and cotton), the consultant will describe the evolution of agricultural commodity marketing, price and distribution policies of the Government of Niger. Throughout the analysis priority will be given to policies concerning food grains. The description of marketing, price and distribution policies of agricultural commodities will include a summary description of the governmental agencies responsible for the implementation of such policies, and the evolution and performance of these agencies. This description of public agencies will contain an inventory of the existing public infrastructure and resources available (human and financial) to operate such facilities.

The Agricultural marketing and storage specialist will describe proposed policies for agricultural commodity marketing, storage and distribution as contained in the new five-year plan (1979-1983). In respect to food grains, this description will describe considerations for a government security stock of cereal grain and a grain price stabilization or reserve stock. This description will examine proposed policies governing the import and export of agricultural commodities including food grains. The role of the private sector in agricultural commodity trading as envisioned in the policies contained in the five-year plan will be summarized and related to the role of public institutions.

Using available studies, reports and the mission's preliminary analysis of such documentation, the consultant will summarize existing marketing systems for the major agricultural production commodities (food grains, ground nuts and cotton). The description will include, as is possible from existing information, the role of the private sector in these marketing systems. Specifically the description will consider the volume of commodity flows in both the private sector and public sector, price levels in both systems, and indicate normal production areas and consumption/utilization centers. At the micro-level, and with other team members, the consultant will describe typical producer marketing and storage practices. When possible, factors determining marketing practices by producers will be identified and described as completely as possible. The consultant, again as possible from existing information, will describe influences of marketing systems on production decisions at the farm level.

The consultant will evaluate the objectives and policies being pursued by the GON in respect to the marketing of agricultural commodities in terms of cost effectiveness and technical feasibility. In evaluating GON policies, the consultant

will indicate the expected effect of such policies on crop production, farm income and consumer's income. The consultant, with other team members, mission personnel and GON officials will identify probable areas where external donor assistance will be needed and can effectively be used in order to assist the GON implement its proposed agricultural commodity marketing, storage and distribution policies.

Qualifications: The grain marketing and storage specialist must have advanced degrees in agricultural economics and/or marketing. The consultant must have the analytical skills to review marketing and price policies for agricultural commodities especially food grains and be able to analyze organization -eficiencies in carrying out stated policies.

The consultant must have a French reading/speaking capability equivalent to the FSI S-3/R-3 level. Experience in studying cereal marketing and storage problems in the Sahel is essential.

TOR - COOPERATIVE SPECIALIST

Objective: To assess the progress and evolution of the cooperative movement in Niger and determine likely constraints in meeting its proposed objective in the five-year plan 1979-1983.

Description: The Government of Niger (GON) has long used the cooperative structure as a means of mobilizing popular participation in rural development, of making improved inputs available to farmers of assisting in the marketing of farm output. Present GON development strategies still emphasize the role of cooperatives in rural development.

The consultant will review and summarize GON policies concerning the role of cooperatives in agricultural development, strategies used to create village cooperative structures and the evolution of the cooperative structure. In describing the evolution of the organization, the consultant will describe fully the present cooperative institution and infrastructure. Such a description will include the human and financial resources available for the cooperative organization.

The second part of the analysis expected from the consultant will examine the operating procedures of the GON's cooperative (Union Nigerienne de Credit et Cooperatives) organization in fulfilling its objectives. Specifically the consultant is to examine UNCC procedures for establishing cooperative structures in rural villages, upgrading human resources at the village level, and integrating participating farmers into the management of the local cooperatives. The consultant will also examine procedures for supplying the needed farm inputs and assisting farmers in marketing their agricultural production. Such an analysis will include procurement procedures for the centralized procurement of agricultural inputs (fertilizers, fungicides, pesticides, farm implements, etc.), receiving and quality control procedures, warehousing and distribution to regional centers and farm cooperative members. The analysis will describe financial resources available for the procurement of such inputs for the period 1979-1983 and will describe GON farm subsidy policies for agricultural production inputs. The consultant will describe information flows accompanying improved inputs to farmers to ensure their proper usage.

After describing the evolution and current operations of the UNCC, the consultant will identify the major constraints to be overcome in order for the UNCC to function as planned in the current five-year plan and will identify measures that AID can undertake to assist in alleviating the identified constraints. In identifying future assistance to the Nigerien cooperative effort the cooperative specialist will consult with Nigerien officials, Mission and AID project personnel and will work closely with the other members of the agricultural analysis team.

Qualifications: The cooperative specialist must have managerial training and experience in the organization and management of cooperatives in LDCs and preferably in West Africa. The consultant must have the analytical capability to review agricultural cooperative policies and organizations, and managerial capabilities to determine deficiencies in financial, logistical, procurement and distribution systems. Since much of the material to be analyzed is available only in French, the consultant must have a French reading/speaking capability equivalent to the S-3/R-3 level.

TOR - AGRICULTURAL EXTENSION ADVISOR

Objective: To assess the progress and evolution of the Nigerian Agricultural service and particularly its extension function in respect to rainfed producers. From this analysis, the consultant will determine possible constraints in meeting the proposed objectives of the Agriculture service as contained in its 1979-83 plan.

Description: The GON's Agricultural service has been a key element in implementing the Government's development strategy and will continue to play such a role in the framework of the new five-year plan. One of the most important aspects of the Agricultural service is its extension organization providing outreach to farmers. Key elements of this extension/agricultural services program and operations have been identified for review and consideration by the Ag sector analysis team and in particular the Agricultural extension specialist. Key elements of the GON's extension policies to be addressed include the following:

- a description of the available channels and resources for extending technical packages to dryland farmers. This will include a summary description of the Agricultural service infrastructure, budget, staff, management procedures, and cooperating local-level organizations as developed by various productivity projects.
- a description of the Agricultural service's approach to farmers in order to induce participation and/or acceptance of recommended technical packages. Included in this section should be a description of the extension effort promoted by the productivity projects, the use of auxiliary agricultural agents, the use of demonstration plots, and young farmer training centers.
- a description of organizations associated with the Agricultural service which provide inputs into the service's programs (professional training centers, research organizations, etc.), or assist in reaching village level farmers (UNCC, OPVN, Animation, Productivity Projects, etc.) The description will focus on the organizational linkages to promote exchanges needed between the organizations serving the farming population.
- a description of agricultural extension planning and programming procedures including evaluations and other feed back mechanisms which make village needs and experiences known to the governmental technical services.

The agricultural extension specialist will provide a description of the fore-mentioned elements as they have been practiced in the past government strategies for agricultural development; as they appear presently; as they are envisioned in the Agricultural service's strategy contained in the five-year plan.

After having completed such an analysis, the agricultural extension specialist will evaluate the strategies and policies of the agricultural service as proposed in the five-year plan and identify possible constraints and areas where AID assistance may be able to assist in the alleviation of identified constraints. In identifying constraints, the agricultural extension specialist, with other team members, will examine at least the following:

- Manpower and budgetary constraints, organizational constraints, social constraints, subsidy policies and the viability of proposed technical packages used in the agricultural extension program.

Qualifications: The agricultural extension specialist must have graduate training in a relevant agricultural discipline and experience with extension programs in the Sahel and preferably Niger. The consultant must have the analytical skills to analyze agricultural extension policies, administrative and organizational structures, the delivery system, and the technical package of improved production practices. The consultant must have a French reading/speaking capability equivalent to S-3/R-3 level, since much of the material to be analyzed is available only in French.

TOR - AGRICULTURAL ECONOMIST

Objective: To assist in identifying medium term growth trends of the Agricultural Sector and identify and describe economic factors affecting agricultural production.

Description--General: In accordance with general directives of the USAID/Niger mission and in consultation with the other members of the Agricultural Sector Analysis team, the agricultural economist will review preliminary analyses completed for the Agricultural Sector Analysis and other available materials pertaining to the general performance of the Nigerien economy and the agricultural sector over the period 1965-1978. The consultant is expected to summarize the growth trends of the national economy, the historical role of agricultural sector in the performance of the national economy, major growth and development trends of the agricultural sector and the relationship of these growth trends to various sets of development policies pursued by the Government of Niger. The consultant will review the compiled micro-economic data and will describe typical farm operations in representative environmental zones. Finally, using information available from the Agricultural Sector Analysis and in consultation with the GON and the USAID/Niger Mission, he will assist in the identification and formulation of projects to continue the effort began under the Niger Cereals Project. The agricultural economist will identify issues of an economic nature prior to the drafting of a PP which must be addressed in the design of these projects and will advise the mission of measures to be taken to resolve such issues.

Specific Tasks:

- A. The consultant will review and summarize the macro-economic analysis made as part of the first phase of the Agricultural Sector Analysis. The summary is expected to clearly define major trends in the national economy and the changing role that primary sector plays in the nation's development given the increasing importance of revenues generated from mineral extraction.
- B. The agricultural economist will review analyses and data compiled prior to the team's arrival on:
 - (a) agricultural policies of the GON from 1965 to 1983;
 - (b) resource allocations in implementing these policies;
 - (c) aggregated output of the rainfed agricultural sector between 1965 and 1978; and
 - (d) other relevant reports on the performance of the Nigerien agriculture sector.

From these, the consultant will identify trends in the growth of the sector and to the extent possible the causes of such trends. In determining the cause of growth trends, the consultant, working with the other team members, will consider at least the following: GON policies and public investment, world market prices, environmental and climatic factors and technical aspects of production such as land availability and quality, changes in agricultural labor force, etc.

After having reviewed and summarized past performance of the agricultural sector, the consultant will estimate growth trends of the sector during the 1979-1983 planning period, specifically identifying major constraints to achieving planned sector objectives. With the other Ag Sector Analysis team members, the consultant will suggest areas of investment to remove or alleviate identified constraints.

- C. Using micro-economic information compiled for the team and in consultation with the other team members, the agricultural economist will describe typical rainfed farming operations in representative climatic/environmental zones. The profiles of typical farm operations will include:
- (1) average size of farm and cropping patterns;
 - (2) average size of household;
 - (3) average crop output;
 - (4) average livestock holdings;
 - (5) estimated farm household budget;
 - (6) typical farm output marketing practices; and
 - (7) seasonal labor availability on family farms.
- D. The agricultural economist, with the extension advisor, will analyze the cost of the improved technical package for increasing rural productivity and the expected return on this investment accruing to the typical farmer. The consultant will also examine the labor requirements of implementing the package of improved techniques and the likely impact of the labor requirement on the Nigerien agricultural labor force. The consultant will examine the current subsidy policies encouraging farmers to accept these improved practices and the long-term implications of these subsidies on the national budget.
- E. After having reviewed the performance of the rainfed agricultural sector, government plans and policies, and the evaluations of the Niger Cereals project, the agricultural economist will, in consultation with GON officials, USAID/Niger officials and other team members, assist in the identification and drafting of PID's for follow-on projects to the Niger Cereals project. Specifically the consultant will assure that the economic constraints identified by various economic analyses are addressed, will participate in considering various alternative means of accomplishing the projects' purposes and identify further analysis required prior

to the design of the Project Paper (PP). Some preliminary assessment of the projects will be expected from the consultant for inclusion in the PID and procedures and information needed for the economic analysis in the PP will be specified.

Qualifications: The consultant must have graduate training in agricultural economics and a working familiarity with macro- and micro-economic analytical skills. The consultant must also have experience in agricultural development policy analysis. In order to draw valid conclusions from field data, the consultant must have some experience in performing economic analysis and policy analysis in Africa and preferably in West Africa. In addition, the consultant must have at least a French reading/speaking capability equivalent to the S-3/R-3 level.

TOR - RURAL SOCIOLOGIST

Objective: To assist in identifying socio-cultural factors affecting agricultural production and rural productivity in Niger.

Description: In accordance with the general guidance provided for social analysis in Handbook 3 and general directives from the USAID/Niger mission, the sociologist will review published and unpublished ethnographic, sociological and agricultural planning and policy documents and literature pertaining to the agricultural sector of Niger. Specific attention will be given to the rainfed sub-sector which includes food grain production and cash crop production such as cotton and groundnuts. The consultant is expected to prepare the portion of the Agricultural Sector Analysis described below and then, using information available for the Agricultural Sector Analysis, complete preliminary social soundness analysis for two Project Identification Documents.

The consultant will analyze and describe the degree to which changes in the agricultural sector production system and ag sector output have been influenced by governmental policies. The consultant will determine the degree to which the government's agricultural policies have been effective in reaching the local rural population and the degree to which these policies have actually affected and may be expected to further affect the welfare of target groups. The consultant will determine to the degree possible what policies pursued by the Government of Niger have been effective in improving rural welfare. Assisted by other team members, some estimate will be made as to the magnitude of this and why the effect is considered positive. The consultant will also indicate which policy options pursued by the GON have been inconsequential or have not produced the desired effect.

In determining the effect of Government agricultural development policies, the consultant will, in cooperation with other team members, describe the changes in the agricultural production and marketing activities of rural populations in representative ecological and ethnic zones and analyze the probable consequence of such changes on rural or village social institutions and the general welfare of rural people. Specifically, the consultant should consider at least the following commonly accepted indicators of development:

- (a) rural income levels
- (b) nutrition levels
- (c) education levels
- (d) self-management
- (e) labor allocation and movements

The consultant is also expected to identify changes which have occurred in the traditional role of women in agricultural production and marketing and evaluate the probable impact of such changes in social institutions (i.e., family) and women's general welfare.

Based on the analysis of past GON policies for Agricultural Development, the consultant will identify areas where changes proposed by the current set of governmental policies for agricultural development may be stimulated or inhibited by social factors in rural villages which influence human resource mobilization, land utilization and adaptation of improved technologies.

Qualifications: The consultant must have graduate training in sociology, or anthropology with a good familiarity with political science or sociological research methodologies. In addition, the consultant must have at least a French reading/speaking capability equivalent to the S-3/R-3 level. Finally, as the work of the consultant will involve a historical review of GON agricultural policies and their effect on rural people, the consultant must have field experience in conducting sociological research in Niger among one of the relevant ethnic groups in Niger involved in rainfed agricultural production.

TOR - AGRONOMIST

Objective: To assist in identifying soil conditions and land use patterns affecting agricultural production and rural productivity in Niger.

Description: In accordance with the general guidance provided for technical analysis in Handbook 3 and general directives from the USAID/Niger Mission, the agronomist will review published and unpublished material concerning agronomic, pedological and land-use conditions relating to the agricultural development of Niger. Specific attention will be given to the rainfed sub-sector production which includes millet, sorghum, cowpeas, cotton and groundnuts. The consultant is expected to prepare the portion of the Agricultural Sector Analysis described below and then, using information available from this exercise, suggest and document means by which AID can assist the GON in alleviating these constraints.

A review of the literature available on patterns of land utilization, soil resources, crop production and crop yields has suggested a gradual deterioration of soil fertility. Population increases, cropping practices, soil management techniques and the lack of long term soil conservation practices are felt to contribute to declining soil fertility. Seed varieties, planting and weeding techniques plus the inevitable variation in rainfall are also factors which could contribute to declining yields. A proper agricultural development strategy must be some combination of efforts to encourage production, improve yields while maintaining soil fertility.

As a preliminary phase of the Agricultural Sector Analysis the Mission has collected numerous documents related to land use, soil conditions and production output and yields. The Mission has also gathered information on policies and strategies used by the GON which directly encourage certain trends in the allocation and utilization of soil resources. From a review of available materials and experience, the mission has attempted to define areas of probable major constraints limiting the expansion of rainfed agricultural production in Niger.

The Agronomist will review and summarize the major constraints which limit agricultural production and will closely examine GON policies and programs which relate to such constraints. Policies and programs will be analyzed to determine production constraints recognized by the government and, to the extent possible, the priority assigned to resolving identified constraints. The analysis of GON policies is expected to describe changes in GON priorities and evaluate, as possible, the impact of a set of policies on the natural resource base of the country. This analysis should also document the GON's ability to identify agronomic conditions limiting agricultural development and to systematically alleviate such factors. In sum, the consultant, using materials collected by the Mission, preliminary analysis completed by the Mission and other assessment team members, is expected to identify the major agronomic factors limiting the sustainable growth of the

rained agricultural sector output. From reviewing the evolution of GON policies, the consultant will describe constraints which the GON recognizes and has or is addressing. In comparing the two analyses, the consultant will assess the adequacy to the government's efforts to treat the long-term problems of maintaining and improving the nation's agricultural resource base while encouraging short- and medium-term increases in crop production.

The agronomist will examine the elements making up the technical package for improved production to ascertain how well it addresses the identified agronomic limitations. When possible, quantifiable data will be used to show the effect of the proper application of the technical package. The analysis of the technical package will examine its probable long-term affect on the land resource base as well as the more immediate impact on crop yields. The consultant will also determine whether the existing packages are sufficiently viable to be introduced on a large enough scale to have a significant impact on the agricultural sector or whether conditions in various regions require the development of additional packages.

The agronomist, with the agricultural research administrator, will summarize research policies and programs of the Nigerien Government and will, with other team members, evaluate the coherence, applicability and effectiveness of the GON research effort in terms of its relationship to the potential and existing agriculture production and land management problems. The consultant will examine the linkages between research organizations and the agricultural service to determine the efficiency with which research results are translated into programs applicable to farmers.

As time permits, the consultant will examine the possibility of the introduction of new crops in Niger, especially off-season crops such as fruit trees, jojoba and guayule.

Using information from the Agricultural Sector Analysis and in consultation with other team members,, GON and USAID/Niger officials, the consultant will assist in the identification and preliminary conception of projects to continue the effort begun under the Niger Cereals Project.

Qualifications: The agronomist must have advanced degree(s) in either soil science or agronomy. Formal training must be accompanied with professional work experience in Tropical soils research and/or millet and sorghum production. The consultant must also have experience in analyzing land-use policies and improved food cereals production techniques in tropical conditions. The consultant must have a French speaking/reading capability equivalent to the FSI S-2/R-3 level. Previous experience in Sahelian agricultural planning is recommended.